# Scientific American.

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### Improved Foot Bellows.

This isolated and mysterious-looking individual is an illustration of the ease with which two things can be done at the same time, if we only have the proper tools. In blowing forge fires by the old-fashioned bellows, one hand rests on the pole continually, and is always occupied, so that to replenish the fire, or do any little office that requires special attention, the blast must stop and time be lost thereby. Not only is this the fact, but the common bellows require muscle to operate them all day; whereas the weight of the workman does the business in these, leaving both hands free to perform any duty they may find to do. In the illustration the bellows are shown set end to end on a platform, and connected by a strap, so that when one is in a state of collapse the other is full, thereby a continuous current is kept up at all times. The action of this apparatus is carried on by simply rocking the body from side to side, thus throwing the weight off from one foot on to the other. For very many purposes it will be found a useful substitute for the old mode of operating bellows.

Patented through the Scientific American Patent Agency, on the 25th of October, 1854, by Henry Neumeyer, whom address at Macungie, Lehigh Co., Pa, for further information.

NEUMEYER'S FOOT BELLOWS.

### Vaccination from the Cow.

At Naples they vaccinate directly from the cow. The subject has been seriously taken up in Paris, and it is estimated that a good commercial speculation can be made of it. A cow, it is said, will produce 100 pustules, which, at 5 francs each, will bring 500 francs, the cow suffering no deterioration in value. The practice is greatly recommended by the safety it ensures that no other contagion will be communicated along with the cowpox. Smallpox is rather prevalent in and around Paris, and people are becoming anxious on the subject. It is recommended here that the cow should be vaccinated by twelve or fifteen small punctures around the vulva, a part the animal cannot get at. The pustules ripen about the 8th or 12th day. The lymph is too thick to put in tubes, but must be taken on glass plates, which can be moistened when the matter is wanted. A good idea has been started by one doctor, namely, that it will be just as well to drink the milk of an infected cow as to get vaccinated. The doctor has made the experiment. He vaccinated a cow on the udder and got two good pustules. He then gave the milk to two infants, and afterwards tried to vaccinate them, but without success, while a third infant who had had none of the milk was at once inoculated by the same virus. He recommends that young ladies who are afraid of a prick with a lancet should drink a glass of milk every three or four years to save them from the small-pox!!

### The Coal Trade of the United States.

The anthracite coal trade of the year just passed amounts to nine million nine hundred and ninety-two thousand eight hundred and seven tuns, an increase of five hundred and fifty-seven thousand six hundred and twenty-four tuns. With the bituminous coal the total amount is eleven million seven hundred and forty-one thousand one hundred and thirty-nine tuns. The increase of domestic coal is six hundred and thirty thousand tuns. The decrease in foreign coal was four hundred and ninety thousand one hundred and sixty-seven tuns. The colliery capacity of the different regions is ample to supply all the coal the market will require. Miners and laborers are more abundant. The supply of coal in 1865 will depend altogether on the transporting capacity to convey it to market.—*Pottsville Mining Journal.*

### The Manufacture of Cast-iron Guns.

The Pittsburgh *Commercial* gives the following information concerning the manufacture of large guns at the Fort Pitt Works:—

"The iron of which the guns are made, costs from ninety to ninety-five dollars per tun. About five per cent of this is lost in the form of cinders and impurities. The amount of coal required for melting to the proper point for casting, is about twelve and a half bushels to each ton of metal. No blast is used in melting metal for casting cannon, by which means the admixture of sulphur and other impurities, inevitable in smelting with coke in a cupola, is avoided. The principal work now done here is the making of 8-inch, 10-inch and 15-inch Columbiads, for both army and navy use, and 32-pounder guns for the latter. These differ, in that a great proportion of the weight in a navy gun is behind the trunnions, and that it is supplied with a breech-screw, while the army Columbiad is accurately balanced on its trunnions. Some rifled guns have been made here, but not many In making them the practice is to cast them in molds one size above their caliber, as, for instance, an 8-inch rifle is cast in a 10-inch mold. All the lifting of these huge masses of iron is done by cranes built by Mr. Jos. Kaye. These cranes are in themselves wonders. One which is worked by a toy-like engine, having but a five inch cylinder and one foot stroke, multiplies its power in the ratio of 1000 to 1, and lifts and moves about in any direction with the most perfect ease a weight of thirty-eight tuns, effecting inconceivable economy of labor.

The facilities of this immense establishment, with its four furnaces, fourteen casting pits, twenty-six finishing lathes, and one hundred and eighty skilled and intelligent workmen, are such that it can turn out weekly, two 15-inch, eight 10-inch, and four 8-inch Columbiads; besides one or two 31-pounders for navy use.

THE American Automatic Stop Motion Company, whose several inventions were illustrated in No. 7, current volume of the SCIENTIFIC AMERICAN, requests us to announce that State rights are for sale on application to the company, at Newburyport, Mass.

IT is said that many lives were saved at the recent Philadelphia fire by the device of pelting the upper windows of tenements with snow-balls, which, breaking the glass, awakened the inmates in time to make their escape, which a few moments delay would have rendered impossible.

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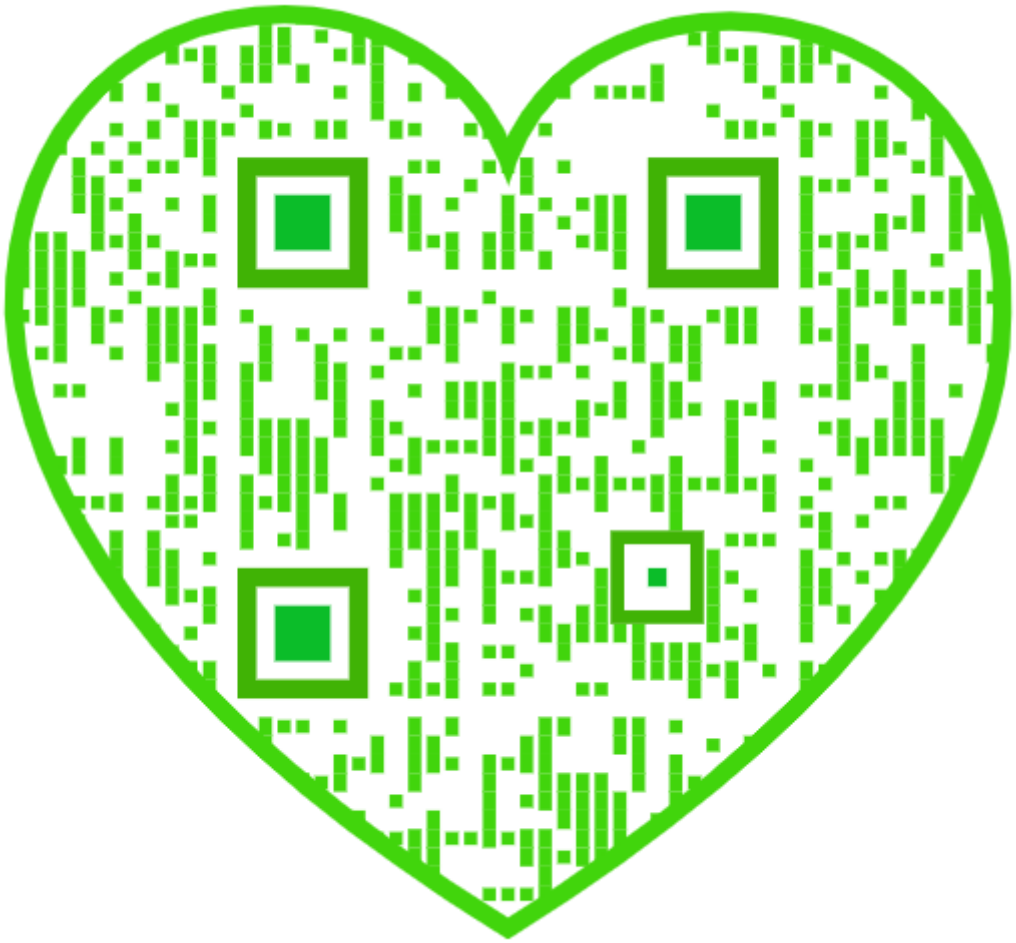

## REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

[Continued from page 115.]

Matter is governed by the principles of heat, light, etc., and it at the same time owes its origin to these principles. It is these very principles which constitute the qualities and properties of matter. Remove all qualities and properties from matter, and nothing remains. All matter is an incorporation of force. Dr. Dalton's idea that the properties of matter are fixed and permanently lodged in infinitely small atoms, is too unphilosophical to be variously entertained any longer. It is this imaginary hypothesis which forms the great bulwark of the material philosophy. No end can be assigned to the divisibility of matter. In its minutest atoms matter remains an incorporation of force, and when we, in our imagination, carry division to infinity, we at last arrive at the mathematical point, which is the true center of force. From this imaginary point, this geometrical center the spiritual principle takes its start; space is occupied, time is consumed, and the material is born.

The difference between mechanical mixtures and chemical combinations is, that in the former the component parts do not loose their qualities or properties in themselves; they preserve their identity. In a mixture of salt and water, water remains water, and salt remains salt. But in a chemical composition the component parts lose their individual identities and they jointly form a new body, with new properties or qualities. In the chemical composition the various component parts, *as such, do not longer exist.* For instance, 8lbs. of oxygen and 1lb. of hydrogen form 9lbs. of water. Now water is an entirely new body, totally different and distinct from either oxygen or hydrogen. Neither the one nor the other exists in water. Oxygen is a certain incorporation of force, so is hydrogen. Combined in certain chemical proportions, a new incorporation of force has been evolved, and this has no direct relationships to those from which it sprang. The process of nature, when examined through a material eye alone, is unintelligible, and finds no echo in the human soul. But when scrutinized with a spiritual eye, the whole process becomes spiritual; we are no longer dead atoms moving about according to law, but we see the law itself, the principle, assuming shape and form.

Mechanical action proceeds from an outside impulse and is simply communicated. Dynamical motion originates from an inner cause, but the first impulse toward that inner process is also imparted from the outside. There is no process in nature which is self generating and self existing.

Molecular action proceeds from the center outward. The molecular condition of matter is not only quantitative but also qualitative; it is an inner state, an inner affection, not only an aggregation. When the caloric affections of two contiguous molecules are disturbed in their relative intensity, then their mutual endeavor is to restore the lost equilibrium. This endeavor produces the sensation of heat.

An increase of heat causes expansion, a decrease produces contraction of the particles of matter. This expansion and contraction proceeds as far as the molecular structure of the body permits. The affection of matter for heat is fixed within the range of 32° to 212° Fahrenheit. Nor is its rate of contraction and expansion perfectly uniform within those limits. It appears that the maximum density of water corresponds to 40° and not to 32°. It is probably owing to this provision, that the water of the ocean, even at the greatest depth, and under the greatest pressure never solidifies. At a depth of 10 miles the pressure is over 23,000 lbs. per square inch, enough to force water through any kind of metal, yet at this depth it remains flu'd. In order to freeze, water must expand, which it cannot do owing to the great pressure. Above and below 40° water expands. At 32° it forms into ice, at 212° it forms steam. To convert water of 32° into ice of the same temperature, 142° of heat must be abstracted, and the loss of heat cannot be discovered by the thermometer. *Vice versa*, if ice is to be converted into water, the same amount of heat must be absorbed. In the old language these 142° of heat have become *latent*, because they are insensible to the thermometer. The conversion of ice into water consumes an expenditure of expansive force, equivalent to 142° of heat; and because this expansive energy is appropriated, incorporated by the molecules of ice, therefore has it become insensible to the thermometer. So long as ice remains ice, an increase or decrease of its specific temperature or heat may be discerned by the thermometer, because in that condition ice is simply a receptacle or conductor of heat, and any want of equilibrium between the ice and the mercury of the thermometer will at once be indicated by the latter, either by its contraction or expansion. The same with water between 32° and 212°. So long as it remains water, heat will only affect it specifically like any other conductor.

Heat is an expansive power. Remove this principle from matter entirely, if such were possible, and it would shrink to an absolute nothing. On the contrary, an infinite increase of heat would expand matter infinitely. It is owing to the presence of the caloric principle in matter, in certain fixed ratios, that it has a natural or outward existence. A comparative small degree of caloric principle in the form of latent heat constitutes solid matter; an increased quantity of that same energy will change the solid state to a liquid; and a still higher degree will convert it into vapor.

There is no essential difference between latent heat and specific. Latent heat is simply absorbed or incorporated heat; specific heat, on the other hand, is free heat; that is free to act, to expand or contract. *Free* and *incorporated* heat would be more significant terms. When ice of 32° absorbs 142° of caloric, it becomes water, and this amount of expansive energy is incorporated for the purpose of keeping the molecules of water apart, and to prevent them from congealing into a solid mass. The static condition of the molecules of water is neutral; there is perfect equilibrium between them; they neither adhere to each other, nor have they any disposition to fly apart. It requires 142° of incorporated heat or expansive energy, to maintain this fluidity. All matter has a centralizing contracting tendency. All matter wants to go to the center, hence the force of gravitation and aggregation. The whole universe would collapse into one single point, if it was not for the expansive power of heat and the centrifugal tendency in cosmic motions.

From 32° to 212° the molecular structure of water undergoes no change; it only serves as a conductor for specific heat within those limits. But on absorbing more expansive energy its molecular condition is suddenly changed, and the atoms of water fly apart. Water in fact ceases to be water, it is converted into vapor or steam. The boiling point of water or any other fluid depends upon the pressure of the atmosphere, or the vapor, which rests upon its surface. This superincumbent pressure determines the rate of expansive force required to release the fluid molecules from their equilibrated condition, and to cause them to expand. The pressure of one atmosphere allows water to boil at 212°. Under a pressure of two atmospheres 250° are needed; under four atmospheres 292°, etc. As the superincumbent pressure increases more expansive force must be expended to overcome it.

One cubic inch of boiling water of 212°, when converted into saturated steam, will have expanded 1700 times. Saturated steam of a given temperature can only attain a certain density and pressure, neither more nor less, because it is its caloric condition or state which determines its density and also its pressure and elasticity. Expansive action is governed by this simple fact.

More than 1000° of heat are absorbed by water of 212° before it assumes the form of vapor or steam under the pressure of one atmosphere. Now this large amount of caloric energy is needed to overcome the molecular tendency of the fluid state, and therefore it becomes truly incorporated, because it is not the water alone which forms the steam, but the water and heat combined. In steam there is no water, properly speaking. Steam is vapor, not composed of small particles of water, but entirely destitute of all water. Water is only a material form. The expansive energy of heat takes hold of this form for the purpose of expanding, and when expanded, the form of water is gone; it no longer exists as water, it has become steam, which is essentially different from water. Water no longer exists in pure steam in the form of expanded bubbles or minute globes, but these globes have absolutely been reduced to mathematical points, centers of expansion. In steam water has become a simple vehicle of expansive energy, and in this new form of matter the fluid has lost its former identity.

All forces result from matter in motion. Matter at rest is neither force nor motion. Matter destitute of natural qualities and properties, is reduced to the simple material, the ponderable substance. But we know that all qualities and properties are incorporated forces. And since we know of no matter without qualities or properties, we conclude there is no matter at rest dynamically. When our senses are affected, our eye, ear, smell, taste, feeling, we know this affection results from impressions caused by forces, that is matter in motion. Matter is constantly affected by these forces or energies, which constitute its life, that is, its qualities and properties. Abstract these energies from matter and nothing is left but the abstract substance without any quality and property. What matter is and appears is consequently owing to those energies, by which it is affected.

Matter at rest is neither force nor motion. The simple ponderable substance being a *constant* element, force therefore resolves itself simply into motion. A force at rest is a force without motion, which is no force at all. A force at rest is at rest because it is balanced by some other force or by its own reaction. A rock at rest, that is supported by a secure foundation, produces pressure, but this pressure is no force without motion. The simple pressure is balanced by the reaction of the foundation, but at the same time this pressure is felt through the whole earth.

The elasticity of steam confined within a boiler and at rest is a force at rest, producing simple pressure, which is met by the resistance or coherence of the iron. The tension of a piano string is equilibrated by the pins and the iron plate in which they are fastened. The expansive tendency of the string or of steam are balanced by other energies, and thus being at rest no force results. Force is produced only when this equilibrium is disturbed and when motions take place. This is equally true of pressure, tension, dynamical and chemical conditions. All motions are the result of disturbed equilibrium. A disturbance in the balance of dynamical affections produces motion. But this proposition may also be reversed; motion is the cause of all disturbance. There is no difference between motion and energy; they are identical. Motion arrested produces rest. So does energy, when arrested or balanced by some other energy. But energy arrested is not lost; it continues to exist as tension or pressure, suppressed affection or feeling.

[To be continued.

## DRY PRINTING OF FRACTIONAL CURRENCY.

In No. 5 of current volume, under the head of Editorial Correspondence, you allude to the dry-printing process as now carried on in the Treasury Department. You say:—"The question of dry printing by hydrostatic pressure, to which reference is made on page 294 of our last volume, is practically settled; some eighty presses are printing fractional currency, and it is done more rapidly, we think, than by the process of wet printing. There is less manipulation required, while the work is finished in a superior manner."

My business being such as to frequently bring me in contact with printers, I have obtained reliable information on the subject of this dry printing as now carried on in the Treasury, which leads me to believe that your opinion is based more on representations than on personal observations, which your limited time did not probably allow you to make It is true, printing can be done by hydrostatic pressure, but the work is not to be compared in finish to that done by hand on the old style presses—being blurred and uneven in appearance; the immense pressure required proves quite detrimental to the plates, paper, and the packing on the upper surface of the press; the unevenness of the printing is particularly noticeable on the edges of the sheets. As

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to the question of speed, notwithstanding all the bright anticipations of the projectors of this plan, experience has proved that it cannot be realized. Even at the present moment, when the machinery—after being remodeled a number of times—is supposed to be perfect, as asserted by the Hon. Mr. Garfield, more than four to five hundred impressions cannot be taken in a day with two presses, two men and a boy; while on the hand press, by the wet process, the average is eight hundred to one thousand a day, with one press, one man and a girl. It is also a well-known fact that the machinery is very expensive, and very difficult to construct so as to resist the immense hydrostatic pressure required. Quite a number of presses have been cracked, and are cracking every day, in consequence of such pressure. Any one may ascertain the truth of this assertion by visiting the grounds around the Treasury, where he will see quite a number of those presses broken to pieces. The machinery for this process of printing is quite complicated, requiring steam power, pipes of immense strength to convey the oil to the receiver, and the receiver itself. This unfortunate piece of machinery is quite liable to damage, owing to the very difficult task it is expected to perform. Several of them have been broken; and I predict that, should a large number of presses be worked together, it will be almost impossible to build one strong enough. I will give my reasons for the assertion. The receiver is a cylinder with a piston in it, somewhat in the style of a steam engine; to the piston rod an immense weight is attached to maintain the proper pressure. Into this receiver the oil is forced by steam from the lower story, and, as the pressure and the volume of oil increase, the piston is pushed to one end, thereby taking up the weight attached to the piston rod; all the presses draw their supply of force from the receiver. We will now suppose an impression being taken; the tender opens the cock in connection with the receiver; a certain amount of oil forces the plunger of the press; this necessarily lessens the volume of oil in the receiver, and causes the large weight at the end of the piston rod to fall a certain distance to take up the loss of oil; when the pressure is again equalized, the weight stops suddenly, which causes quite a jarring by the destruction of the momentum acquired in descending. But instead of one press being worked, let us suppose that ten or fifteen are worked, all opening their cocks at the same time; the large weight, instead of falling a few inches, will fall a much greater distance, and, when the presses are all full, will stop with a much greater jarring, according to the laws of gravitation, showing the velocity to increase very rapidly according to the distance traveled. I am certain no metal known would resist the shock given by the stoppage of such a momentum. This will be the inevitable result whenever several presses are worked together. Until now, assertions to the contrary, but four presses have yet been worked together; enough of them, however, to prove my position to be true, as the broken receivers attest for themselves. This dry printing process is also dangerous, as one of those presses bursting under such an immense pressure may cause much damage—even death. Quite an accident happened some time since to one of the employees from such a cause. He noticed the oil spirting from a crack in one of the presses, and so as to prevent it from soiling the place he put his hand to the crack with a handful of cotton waste; the oil being driven with the immense pressure required went right through his hand, and made quite a bad wound. It is well known among the employees of the printing department of the Treasury that this system has proved to be a failure, and a useless experiment at a great cost to the Government; and why in these times of great financial difficulties this experiment is allowed to continue is incomprehensible. It would seem that the amount of money wasted on this experiment could be spent with much more favorable result by providing for the wants of our sick and wounded soldiers. Persons trying to foster such a costly experiment, at this time more than any other, ought to be punished. Should the worthy Secretary of the Treasury have this system of printing inquired into by competent practical printers, I have no doubt that the conclusions would warrant him in preventing further expenditure of money on this worse than useless process. I also wish to call your attention to another branch of the printing department—bronzing. This is said to be security against counterfeiting—in what manner I am unable to say; but it seems to me that the bronzing process is well known to all printers of ornamental show cards, and is nothing new; it is, also, quite an unhealthy process, and should be discontinued. Yellow ink would answer as well, if the yellow must be retained. Another branch—the manufacture of the "filament paper," as it is called, introduced at the commencement of the printing of the fractional currency—has proved itself to be anything but what it was represented to be, and the use of it is now discontinued. In a word, it is a fact that our currency printing department is anything but what it should be; and it seems strange that, with the resources our Government possesses, we have not attained a higher degree of security against counterfeiting. I may also say, by the way, that the article published in the last volume, page 114, contains several errors in regard to dry printing, and must have been written by a person wholly unacquainted with the business.

PRINTER.

[The old question presents itself—"Who shall decide when doctors disagree?" We think the force of our correspondent's communication is somewhat lessened by its denunciatory character which is often made to supply the lack of argument. Our visit to the currency bureau was necessarily somewhat hurried; but, nevertheless, we paid pretty close attention to the wet and dry processes of printing as practiced in the bureau. It is possible that the novelty of the dry process, influenced our opinion, as we are always pleased to witness new processes, and to encourage such whenever we discover merit in them. We have no partiality for any man's pets, and we usually distrust all schemes that savor of a selfish adherence to one's own notions to the exclusion of all others. In the report of the superintendent of the Bureau, he remarks :—

"Experience proves that impressions can be taken as fast as the plates can be inked and put in the press (the process of inking being the same as for wet printing), and this is the only limit to the rapidity of their execution; while every impression is not only perfect in itself, but each is likewise an *exact* counterpart of the original—a result impossiblo by any wet printing. During the last two months not a single imperfect impression has been produced on any one of the dry presses now in use; while by the wet process the product of imperfect impressions is daily reckoned by hundreds. The work of both wet and dry printing is done by journeymen for what are technically termed "piece prices"—that is, a given price per thousand sheets for the number of impressions printed. The piece prices paid for dry printing are nearly twenty per cent less than for wet printing; and when the operatives become expert, it is expected that the entire cost, including wages of valve-tenders and feeders, will be less than the cost of wet printing."

Ex-Secretary Chase indorses the dry process, and the House Committee, of which Gen. Garfield is chairman, also indorses it. Here is reliable testimony which ought at least to mitigate severity of judgment; for it cannot be supposed that these distinguished men would willingly indorse any system that tended to waste the public funds, which our correspondent thinks ought to be used in "providing for the wants of our sick and wounded soldiers."

It appears also, from the report from which we have quoted, that certain influences have combined to prove that the conduct of the superintendent of the bureau had well nigh converted the United States Treasury Department "into a house of orgies and bacchanals." After a careful investigation by Congress he came out of the trial thoroughly vindicated, and his system was indorsed.

We do not know the superintendent who has thus escaped, but we cannot commend a continuance of such attacks as have been made upon his character and fidelity. The system of dry printing is in a fair way to be thoroughly tested, and we do not see either the wisdom or justice of denouncing it until the experiment shall have been completed.

THE Waltham Watch Company manufactures a watch every four minutes of a working day.

### Valuable Practical Recipes.

We extract the following recipes from the *Chemist's and Druggist's Circular:—*

*To restore Tainted Meat.*—If salted, wash it and throw away the brine, then replace it with the following composition, and allow it to remain in it for a few days: Fresh burnt charcoal, powdered, 12 parts; common salt, 11 parts; saltpetre, 4 parts. Mix. This is to be used the same as common salt. When the meat is to be cooked the black color may be removed with clean water.

*To Whiten Tallow.*—Melt the tallow and add a little alum and saltpeter, or a little nitric or sulphuric acid.

*Bandoline (Rose).*—Take Tragacanth, 6 ounces; Rose water, 1 gallon; Mix, and after standing two days strain, and add otto of roses to perfume. May be colored with a little cochineal. The almond bandoline may be made by substituting the oil of bitter almonds for the otto of rose.

*Camphor Ice for Chapped Hands.*—Melt spermaceti, one drachm, with almond oil, one ounce; and add powdered camphor, one drachm. It will be improved by adding a couple of drachms of glycerine, using as much less of the almond oil.

*Water-Proof dressing for Shoes.* 1. Take oil, 5 ounces; wax, ½ ounce; Burgundy pitch, ½ ounce; oil of turpentine, ½ ounce; melt together and apply until the leather is saturated.

2. Suet, rosin, and beeswax melted and applied.

3. A solution of India-rubber, 2 drachms.

*To detect Inks.*- To distinguish writing made with nutgall-ink from that of logwood-ink proceed thus: Immerse the written paper for some seconds in water acidulated with nitric acid (say 6 to 8 drops of nitric acid to an ounce of water); the logwood-ink will assume a yellow-red color and afterwards disappear entirely, while the nutgall-ink will remain unchanged.

*Liquid Blue*—Prussian blue (pure, in fine powder), 1 ounce, is placed in a small matrass or common vial, and concentrated hydrochloric acid, 2 oz., poured on it. Effervescence ensues, and the mixture soon assumes the consistence of a thin paste. After about 24 hours, it may be diluted with 8 or 9 oz of water, and preserved in a glass bottle. The intensity of this color may be lessened by over-doses of water. If the whole be poured into one quart of water, it will still exhibit a color sufficient for washing prints.

### How French Ladies Bathe.

At the trades exhibition in Paris, the pretty things are plentiful, and the collection includes one or two amusing inventions. Foremost among these is a superb car, drawn by silver swans of gigantic proportions. The car is intended for fair bathers. In its fairy network they may recline at their ease, and float upon the waters, and in the waters, buoyed up by the four gallant silver swans, who will bear them safely upon the gentle swell of summer seas. At the fair bather's elbow is a handle that works a screw, and by this screw she may drive her car and her swans at her own sweet will. This is luxury enough, one would imagine, for even a Parisian countess, at Biarritz or Trouville. But the inventor is not satisfied. He knows the ladies for whom he caters; and in the backs of the noble birds he has contrived a liquor-case too.

### Wanted, a better Plow, and a better Reaper and Mower.

A correspondent of the *Prairie Farmer* writes to that journal as follows:—

"We farmers want, in the first place, a better plow than we have yet been furnished. We want one that will scour perfectly, and one that will not let any dirt fall in on the land side, nor over the mold board into the furrow; and last, but not least, we want a plow that will not catch drift under any circumstances. Any man who can get up a plow of this description, will be a national benefactor. Next, we want a combined reaper and mower that will cut as low as one inch, and as high as twenty-six. We want the straw of our grain, if we choose, left on the ground where it belongs; and also want to shave our meadows clean if we like. From all I can see and learn, it is much easier to make a machine that cuts neither high nor low, than any other."

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## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Feb. 9, 1865, the President, S. D. Tillman, Esq. in the chair.

### HATFIELD'S ROLLER SHEAVES.

Mr. Stetson exhibited a model of Hatfield's sheaves for the rollers of sliding doors, the same that was illustrated on page 70, current volume of the SCIENTIFIC AMERICAN.

### TWIST DRILLS.

Mr. Watson brought to the notice of the Association some very beautiful samples of twist drills used by machinists in boring holes in metals, and in alluding to them said :—

"The perfection to which we have attained in metal-working is one of the miracles of modern times. In all of our large machine shops iron is planed and turned in large masses with a speed and accuracy unknown in former times. I have here one of the modern tools used for working metal which is, as may be seen, not only externally beautiful, but constructed on sound principles. I have here also a common flat drill, such as is ordinarily used, and I deem it unnecessary to more than to show you the two, side by side. The advantages resulting from the use of such drills as this twisted one, are, that the work can be done in less than half the time. To say nothing of the first cost of the two tools—which is largely in favor of the twisted drill—it commends itself to mechanics by reason of its perfect accuracy in all that affects size, uniformity of quality and temper. These are standard tools, and as such have a very great value even beyond their intrinsic worth. When I say *standard* I wish to convey the impression that they are all alike. A hole drilled by a thirteen-thirty-second drill to-day, will be the same as one drilled last year by any other drill of that size from the same factory, so that work which is laid off and executed by them can be reconstructed in case of breakage with the certainty that the bolts or other fixtures belonging to the job will fit. Beyond this mechanical advantage there is the very great additional moral one of having in daily use tools that are calculated to excite emulation and stimulate mechanics to do good work instead of poor.

"These drills are of all sizes, from three-eighths, varying by thirty seconds of an inch up to one inch and a quarter, with turned taper shanks and sockets to match and with straight shanks, made of Stubb's wire, from three-eighths down to a sixty-fourth of an inch, or from No. 1 wire to No. 60 wire.

"I can easily conceive what an immense advantage these drills will be to all metal-workers. I have always thought that twist drills should be sold in the stores as cheaply as augers for carpenters; and when I speak of the price it is almost incredible to see how they can be sold for it. Why, sirs, this splendid inch-and-a-quarter drill, turned from end to end with a taper shank, accurately ground and tempered, sold ready to drill a hole with on the spot, costs but five dollars. No man could go to work and make one like it for three times the money. The four sockets cost but $10. I know something of metal-working, and these tools could not be afforded at any thing like the sum, unless the company worked upon a regular system and had ingenious machines constructed for this very purpose.

"It was not my intention, when I came here, to occupy too much time in the discussion of this tool, but I have felt it important to metal-workers that the fact of such drills as these being offered at such moderate prices should be made known. The Manhattan Fire-arms Company of Newark, N. J., the manufacturers, spared no pains or expense to make a perfect tool, and I would advise every one interested in metal-working to send for samples.

"The best fine tools we have in this country are not made here but abroad. I mean by this, small rimmers, screw-plates, and similar wares, and I think that, as members of this Association, we should take pains to make the facts I have stated previously, widely known."

Mr. Arnold, the inventor of machinery for making this drill, was present and gave some interesting information as to the manufacture of the tool.

*Capt. Maynard*—I should like to have the inventor state how he tempers the drills. Does he mean to say that he does not lose any of them, and that they do not buckle or twist in hardening.

*Mr. Arnold*—I can answer that question by saying that we harden them by plunging the shank end in the water first and draw the temper afterward to the right color. The taper on the length of the drill, 12 inches, is barely the sixty-fourth of an inch and we rarely find any so bent that they are useless; a little deviation can easily be corrected by a hammer. Mr. Arnold stated that the drills were never touched by a hammer to be forged from the time the steel was drawn, and was therefore homogeneous throughout.

[As we expect to present our readers with engravings of these drills shortly we forbear further allusion to them.—EDS.]

### TELEGRAPHS.

The regular subject for the evening being telegraphs, Mr. Stetson made some remarks on the subject, in the course of which he stated that dispatches have been sent through wires connected in one line of 1,700 miles, mostly submerged in the Mediterranean.

Dr. Stevens expressed the opinion that the destruction of the Atlantic telegraph is simply a question of time. There are scavengers in the sea, animals that will eat every kind of vegetable matter, and the hemp and gutta percha used in the construction of the cable must sooner or later be destroyed. But the overland route by the way of Behring's Straits, will doubtless prove a success. Extending in a northwest direction from the Red River of the North there is a route entirely across the British Possessions, which is free from mountain ranges, broad rivers, and all other serious obstructions. It is inhabited by half-breed Indians who have been trained to labor by the Fur Company, and who will be glad to put up the line and keep it in order. By this route a line of telegraph can be constructed from New York city to the Russian Possessions without encountering a single mountain in the whole distance.

## Twin Screws and their Engines.

We make the following extracts from the London *Engineer* of January 20th:—

"It is well known that a particular proportion of pitch to diameter of screw, say, about 1¼ to 1, has been found to answer better than either coarser or finer pitches. As twin screws having a given total area of disc require to have but seven-tenths the diameter of single screws of the same power, they would appear to require but seven-tenths the pitch, and would thus require to make more revolutions per minute for a given speed than would single screws, the comparative number of revolutions in a given time being as 10 to 7. Now a rapidly revolving screw gives the very opportunity for the most economical form of engine, so far as lightness and adaptability to expansive working go. If a given speed of piston be determined upon in both cases, the engine making the greater number of revolutions would have a correspondingly shorter stroke; but as the engines of twin screw ships are individually smaller than those of single screw vessels of the same power, there seems to be a good opportunity for increasing the speed of piston. The limit of piston speed, especially with improved packings, large bearings, and with plummer-boxes made to admit of a circulation of water through them, appears to have been hardly yet ascertained. One or two boats made by Mr. Bourne had single cylinder engines, which, with a 3½ ft. stroke, made 100 revolutions per minute, equal to 700ft. of piston per minute. But we are not aware that they worked for any considerable length of time at this rate, although it does not appear improbable that marine engines of moderate size might be made to work regularly at 600ft. Practically, for a given power, the necessary weight of engines is inversely as the speed of piston; and the opportunity for this saving appears to be decidedly greater in twin screw engines than in those which necessarily work at a slower rate. Again, high speed engines, by their greater uniformity of motion, and by reason of the very small space of time for cooling the interior of the cylinder at each stroke, are the best for high expansive working. The irregularity of the motive force throughout the stroke in slow working engines, when the steam is expanded, say, four or five-fold, has led Messrs. Maudslay to introduce three-cylinder engines, and these are already largely in use. At a hundred instead of fifty revolutions per minute, however, the irregularity of motive force would be much less apparent, notwithstanding that the inital and final pressures on each stroke might vary as much as in the case of the slow working engine.

"Twin-screw vessels present an interesting query as to the number of cylinders necessary for each engine. For single screw steamers a pair of cylinders is almost invariably employed, and even triple cylinders, as in the *Tasmania*, and in Messrs. Maudslay's engines of the *Octavia* class, are at least as common as engines with single cylinders. In America, it is true, large screw coasting steamers are made with single cylinders as large, in some cases, as 84in. in diameter, for 3½ ft. stroke. Those who know what it is, with the forward engine of a pair broken down, to get the after engine "over the centre" in starting, will not have much faith in single cylinders for screw vessels. But with twin screws, where each engine can be started independently of the other, and where way can be kept on the ship if one engine is stopped, the difficulty of starting a single engine to each screw shaft would not, probably, be great. In all the twin screw vessels made by Messrs. Dudgeon—most of them being blockade-runners, for which the greatest certainty of working is indispensable—there is a pair of engines to each screw shaft. Duplicate pairs of engines are alike provided in the large trading steamer *Far East*, and in a small rifle-proof boat, of 40-horse power, lately made by these makers for the Dutch Government. For commercial steamers, however, it is probable that a single engine to each screw shaft would answer every purpose.

"In horizontal engines working athwart ship, it is evident that the working parts may be more conveniently arranged where there are two shafts, each some feet to the side of the keel, than a single one directly over it. There is no need, in the former case, for the double piston-rod arrangement, nor for the truck engine, nor the short connecting-rod type sometimes employed. There is additional room to get in the working parts, and if a shorter stroke be adopted, every thing in the engine is shortened with it. The shorter stroke affords a better opportunity also for a good arrangement of vertical engine."

## Hardening Steel in Oil.

We take the following statements in relation to hardening steel in oil from Mr. Holley's recent work on "Ordnance and Armor" :—

"The substitution of a solid-forged steel barrel for the Armstrong coiled tube has often been attempted by Mr. Anderson, although he did not succeed well with steel until the process of hardening in oil was adopted. The apparatus for this process is very simple. An iron tank, filled with oil, and made deep enough to take in the tube vertically, is set within a tank of water, to keep the oil cool. Within the orbit of the crane for lifting the tube is a heating furnace with a wood fire. The temperature of the oil is raised to 280° by a 110-pounder inner tube."

High steel hardened in oil was found by Mr. Kirkaldy to have a tenacity of 215,400 lbs. The following is the provisional specification of Mr. George W. Rendel—one of the Elswick Ordnance Co.—dated November 13, 1863, which sufficiently describes the very simple process:—

"I bring the cannon or parts of cannon to a suitable heat in an oven, or any convenient furnace, and I then plunge them into a bath of oil or other liquid; or instead of plunging the cannon or parts of cannon, I pour the liquid over them; and to keep down the temperature of the liquid, which is raised in the act of cooling the cannon or parts thereof, I employ pipes winding through the liquid, in which pipes a current of cold water circulates, or the liquid may be cooled by any other suitable arrangement; but any arrangement for cooling is not essential to the process of strengthening, being only a matter of convenience, as having the effect of reducing the volume of liquid necessary for cooling large masses of metal."

THE opening of the Suez Canal to navigation throughout its entire length, from the Red Sea to the Mediterranean, has been officially announced to all the chambers of commerce in Europe by M. Lesseps, president and superintendent.

FLOATS in boilers to determine the hight of water are little used at the present time.

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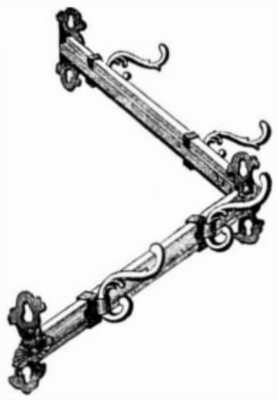
### Improved Hat and Clothes Bar.

The portable hat rack which has been recently introduced, has proved very popular, and there seems to be a general demand for an article of this kind. The illustrations published herewith represent a new style, which can be folded up in a small compass, or extended so as to be used for a number of garments. It is light, convenient, and ornamental, and but little more expensive than ordinary brackets and screws, while it has a good feature in being easily taken down when in the way, and of not marring the walls or doors. The bar is made of the best seasoned black walnut; the hooks are finely finished and japanned or bronzed, and, when ordered, made of brass. Fig. 1 shows the bar as hung on the wall. Fig. 2 shows the hooks as made to slide over the bar; also the rack as it may be closed up; any number of hooks desired can be placed on the bar by simply removing the end piece. Fig. 3 represents the folding rack; the hooks slide on the bar as in Fig. 1. They are also made to turn in a socket, and can be laid flat with the surface of the bar, and when not in use the rack can be folded up in a small compass. For travelers, boarders, as well as for use in families, offices, and hotels generally, this will be found a useful article. It was patented on the 1st of November, 1864, through the Scientific American Patent Agency. For further information address Pratt Brothers, sole proprietors, No. 53 Fulton street, corner of Cliff street. New York.

Fig. 1.

Fig. 2.

Fig. 3.



PRATT'S HAT AND CLOTHES BAR.

### THE ICHNEUMON FLY AND THE DUSKY VAPOR MOTH.

At the last meeting of the Farmers' Club a letter was read asking the names of certain insects which were forwarded in a little paper box. The inquirers were referred to Dr. Trimble, who, after a brief, but careful examination of the specimens, remarked—

These in a cluster of what the writer calls eggs, are not eggs at all; they are cocoons of the ichneumon fly. This other specimen is the Dusky Vapor moth. The caterpillar of this moth is exceedingly beautiful. Caterpillars, as everybody knows, are generally very unprepossessing, but the caterpillar of the Dusky Vapor moth is one of the most beautiful insects that we encounter. I have found them on the shade trees of this city, and they trouble apple trees to some extent. But their numbers are kept within narrow limits by their great enemies—the ichneumon flies. This fly deposits its eggs within the body of the caterpillar, where they hatch, and the larvæ eat up the body of the caterpillar. I have watched these flies going from one caterpillar to another to select a suitable one in which to deposit their eggs. The fly is easily distinguished, she has four wings and a long slender body, more like a wasp than a fly. The instinct by which she selects a caterpillar in which to deposit her eggs is wonderful. When she alights upon the back of a worm she seems to know instantly whether the body of that worm has already been supplied with eggs or not; and you will see her touching on the back first of one caterpillar and then of another, till she finally finds one free from eggs. She then thrusts her sharp ovipositor into his body, and pushes in as many eggs as will hatch worms enough to eat up the body of one caterpillar.

The caterpillar of the Dusky Vapor moth has an instinct also not less wonderful. If the caterpillar is to produce a male moth he simply winds his cocoon and attaches it to a leaf. But if it is to produce a female moth it winds a portion of web around the stem of the leaf and around the branch on which it grows, so as to fasten the leaf to the branch. This is done to protect the eggs through the winter. Of course the cocoon of the male moth requires no such provident care, and the leaf to which it is attached is consequently left to fall. This is one of the most wonderful manifestations of mysterious instinct to be found in the world of insect life.

### Well-boring Machinery at the School of Mines, Philadelphia.

The authorities of the Polytechnic College of Pennsylvania have shown great liberality in providing their several technical schools with the best means of illustration. The schools of chemistry, civil engineering, architecture and mechanical engineering have all had valuable additions made to their collections and cabinets, and, more recently, the school of mines has received, among other models, from Germany, a full set of the instruments used in boring the deep salt wells of that country. The models are made to scale, and they comprise the Derrick, the Cumberland levers, the cutters, reamers and enlargers used in boring; the sand pumps for drawing up the cuttings of stone; jars, crabs and impression blocks, for recovering fragments of broken tools, and the iron rods, wooden poles and connecting pieces, to which the tools proper are attached. Well-boring has been brought to greater perfection in Germany than anywhere else, and the importation of the best tools from that quarter will not only prove of value to the college students of mine engineering, but also to the great industry, which has so suddenly grown up in the north-western portions of Pennsylvania, Virginia and the southern counties of Ohio. That industry now demands the best and most expeditious machinery for its development, and it cannot be doubted that the opportunity which the Polytechnic College affords of examining the best form of boring tools used abroad, and of comparing them with those employed here, will, in due time, enable American inventors to produce boring machinery superior to any now known on either continent.

### Japanese Matches.

Dr. Hofmann lately exhibited to the London Chemical Society some small paper matches, which were lately given to him, and said to have been brought home from Japan. He lighted several of these matches, which burned with a small, scarcely-luminous flame, a red-hot ball of glowing saline matter accumulating as the combustion proceeded. When about one-half of the match had been consumed, the glowing head began to send forth a succession of splendid sparks. The phenomenon gradually assumed the character of a brilliant scintillation very similar to that observed in burning a steel spring in oxygen, only much more delicate, the individual sparks branching out in beautiful dendritic ramifications. His first idea, Dr. Hofmann continued, had been to look for a finely-divided metal in the mixture. But when examined in his laboratory it had been found quite free from metallic constituents, and to contain carbon, sulphur, and nitre only. These constiuents were present in the following proportions:—Carbon, 17·32 sulphur, 29·14; nitre, 53·64. Each match contained about 40 milligrammes of the mixture, which was folded up in fine paper. There had been no difficulty in imitating these matches.

### ROTHFELDER'S IMPROVED CHRONOMETER ESCAPEMENT.

The inventor of this movement furnishes the following description of its advantages and action:—

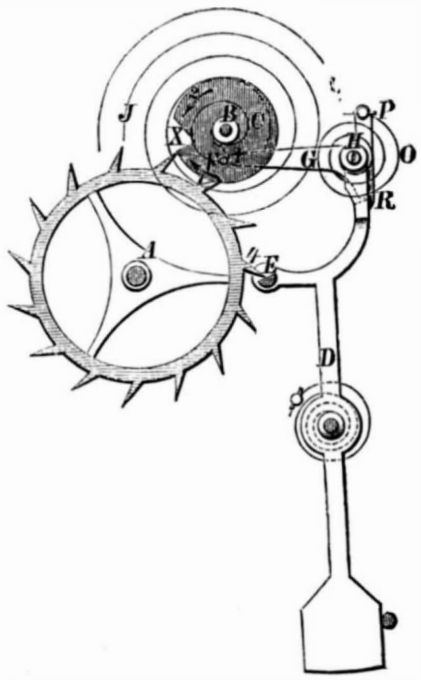
"For half a century the English and French have vainly endeavored to improve and simplify the chronometer, but for all practical and scientific purposes their endeavors have not been crowned with any remarkable result. In this improvement the chronometer, with all its former intricacies, is rendered at once simple, and enables the practical watchmaker to manufacture and repair chronometer escapements with comparative ease, while heretofore it has required considerable skill.

"The cost of the article is by this improvement much reduced, and will enable individuals to supply themselves with one at a limited cost.

"The nature of this invention consists in the construction of the locking lever of chronometer escapements, the same being provided with a secondary or assistant lever, upon the end of which the ruby pin or lifting pallet of the balance operates to disengage the detention on the locking lever from the escape wheel, whereby this escapement operates with more precision and less friction, is more durable, and can be manufactured with greater facility.

"The drawing represents a plain view of the working parts of the escapement in action, when commencing to disengage or unlock the scape wheel.

"In the engraving A represents the scape wheel; B the balance arbor; C the main pallet; D the locking lever; E is the detent pin, which locks the scape wheel; F is the lifting pallet or ruby pin on the main pallet, and G is a T-shaped lever or assistant lever, pivoted to the end, H, of the locking lever, D. Its central arm extends tangentially towards and underneath the main pallet, terminating in a pointed end, I, which engages at proper intervals the lifting pallet, F. J is the ordinary balance spring; K is the balance to the escapement; L is a spiral spring which presses the locking lever against the stop pin, N, and also brings the detent pin, E, in action to lock the escape wheel. The assistant lever, G, is provided with two arms, one of them, P, to attack the spring, O, and the other arm, R, to serve as a stop to retain the normal position of the lever, G. The manner in which these parts act upon one another is as follows; The escape wheel, A, is supposed to be at rest, its tooth, 4, resting upon the detent pin, E, of the locking lever, D, the balance, however, being in motion and the lifting pallet, F, traveling in the direction of

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the arrow, 2, now coming in contact with the lever, G, it will move the locking lever, and consequently the detent pin, E, thus liberating the tooth, 4, of the scape wheel, therefore the notch, X. in the main pallet comes in position, and the tooth, 1, falls in to act upon the side of the notch, X, and giving an impulse to the balance. Now, before the tooth, 1, has left the side of the notch, X, the end, I, of the lever, G, has escaped the lifting pin, F, and the locking lever, D, and detent pin, E, fall back and lock the scape wheel again, and on the return of the balance, as shown by an arrow, 1, the lifting pin, F, forces the end of the lever, G, off, to pass by, whereafter the same operation as before described takes place."

A patent was granted to Mr. Rothfelder for the above described improvements on the 28th of January, 1865. The inventor has also made application for a patent on another improvement, which consists in the winding up and setting of the watch without the aid of a watch key—so many times found wanting when most needed; its mechanism is of the simplest kind and very practical and will not only be an improvement in new watches, but can also be applied to every kind of watches already in use at a trifling expense. These improvements can now be inspected at Mr. Rothfelder's place of business, Nos. 33 and 35 John street, Office No. 1, where any further information can be had.

## Correspondence

### THE WAY THE EARTH IS MEASURED.

Messrs. Editors:—While looking over an article on the French Metric system, published on page 44, vol. X., (new series) Scientific American, the following query suggested itself to my mind, and I dare say many of the readers of your valuable paper would be pleased to see it answered in your columns.

How did the French mathematicians determine the exact distance from the equator to the pole, as this must have been done previously to their deciding that $\frac{1}{10000000}$ of it should constitute their unit of measure? N. S.

Haverhill, Mass., Feb, 11, 1845.

[The size of the earth is ascertained by the simple process of measuring a degree of latitude upon its surface. Every ship master ascertains his latitude every clear day by observing, by means of a quadrant, the hight of the sun at noon, above the horizon, and the latitudes of places may be determined with greater precision by more delicate instruments and observations. To learn the length of a degree it is only necessary to observe the latitude of two points one of which is due south from the other, and then to measure the distance between them.

The first recorded attempt to measure the size of the earth was that of Eratosthenes, of Alexandria, who lived 300 years before the Christian era, but his mode of getting at the latitude of one of his places was by the rough process of observing that the sun, at the summer solstice, sent his rays directly to the bottom of a well.

The first measurement of a degree with modern accuracy was made by Picard, of France, in 1699, and since that time several have been made with great care and labor in different parts of the earth, so that not only the size but the form also of our planet has been determined with great precision. From a complete discussion of all the observations, the astronomer Bessel concludes that the diameter of the earth at the equator is 41,847,194 English feet, and through the poles 41,707,808 feet; showing the diameter to be $\frac{1}{300}$ part greater through the equator than through the poles.

One of the most trustworthy measurements of a degree was that made by Mason and Dixon, in the preliminary surveys for determining the starting point of their famous boundary line between Maryland and Pennsylvania.—Eds.

### The Linen Manufacture.

Messrs. Editors:—Until 12 years ago I was a linen manufacturer in Great Britain, having a thorough acquaintance with Dundee, Belfast and Leeds linen manufacturers. I have made all kinds of linen goods and know how extensively and satisfactorily they are used there. These mills here have some 1500 looms which in former times were employed in cotton and now the companies have invested in linen as an addition to their business and not at all as a substitute for cotton. We make about 1500 seamless, 2 bushel grain bags per day, one half has cotton warp and tow filling and the other half, say 750, has flax warp and tow filling. This last bag is really a first class article and far superior to any I have seen in England for quality of material used. From tests of strength I have made of the yarn I find that the flax warp stood the strain of 20 lbs. weight to three threads stretched 57 inches; the filling stood about the same, while cotton warp broke at 5 lbs.

Any statistics or information which I can give or you may desire shall be gladly given you at any time.

John R. McNally.

Stark Mills, Manchester, N. H., Jan. 31, 1865.

[We should be pleased to receive any statements of facts in relation to the linen manufacture.—Eds.

### Boiler Scale.

Messrs. Editors:—Experience proves that the scale deposited upon the internal portions of a marine boiler is rendered harder and adheres more firmly to the iron surfaces when the water has been frequently driven out, and the boiler allowed to cool off. From this it may be concluded that the scale, as first deposited, is naturally soft, and that it becomes hard by calcination when the boiler is allowed to cool down without the presence of water. It is, therefore, advisable, in all practical cases, when it is desired to remove the heated water from a boiler, not to blow it off hot, but first cool it by the admixture of cold water, and then run it out.

The condition of the internal surfaces of a boiler greatly affects the nature of the salt deposit upon them. Surfaces coated with a slight film of rust have less affinity for scale, and this deposit is comparatively soft, and more readily removed. The amount and nature of the scale will, of course, vary greatly with the density at which it is deposited, and more strikingly with the temperature.

Water containing in solution a large percentum of carbonate and sulphate of lime, forms upon evaporation, particularly at high temperatures, a very hard, compact and regular deposit, which is a perfect nonconductor of heat. Bearing this in mind, the density of the water in the boiler should be kept considerably lower than usual when a predominance of these impurities exist. Various substances have been applied to the internal surfaces of a boiler, in view of lessening the deposit of scale, or at least its tenacity to the iron, but with little success. Tallow, well applied, is beneficial, and has a preservative effect upon the metal, but may be objectionable on boilers liable to foam.

When a surface condenser is used in connection with the boiler the density of water can be safely allowed to ascend above the usual mark. Of course with a perfect surface condenser there is no density to be considered, but unfortunately all surface condensers leak more or less. The density at which the water can be kept with safety, will depend upon the amount of blowing necessary to keep it at the usual density of $1\frac{1}{2}$-32. That is to say, when the amount of blowing is small, the density can be carried above $1\frac{1}{2}$-32, and vice versa. This is evident, as the impurities that deposit in the form of scale are by far the lesser of those contained in the water used, and must be necessarily small in the total amount, when the leakage of salt water through the condenser is also small. The saturation of water is mainly caused by the presence of chloride of sodium and magnesium, which do not deposit within the range of $\frac{1}{32}$ to $\frac{11}{32}$ at ordinary temperatures.

It will be found advantageous, as well as economical, to carry a high degree of saturation in such cases, as a slight film of deposit is beneficial in preserving the internal portions of the boiler from rust and corrosive action. B. E. C., U. S. N.

### Letter from an Inventor.

Messrs. Editors:—With much gratification I learn by your excellent paper that you have succeeded in obtaining a patent for the "Last Wrench." I feel very much pleased with the interest you have always manifested in all the business entrusted to your care. Promptitude seems to be the motto in everything connected with the Scientific American.

I am doing very well with all my patents.

George Meader.

Ottowa, Ill.

### The Problem of Two Wheels.

Messrs. Editors:—Herewith is an attempt at a reply to the problem in the last No. of the Scientific American.

Let A and B be the wheels, part of each of which is composed of wood and part of iron, as required by the problem, A having the iron placed near the center, and B having it disposed around the periphery, the wood occupying the alternate parts of each.

Now the periphery of each wheel will, in rolling, require to travel a distance equal to twice that over which the center moves, since every portion of it performs one revolution round the axis, at the same time that it is being carried forward with the axis, a distance equal to the circumference. Hence the motion of every other part is greater than that of the center, but decreases as it approaches the center and the iron, when placed around the outside of the wheel, travels farther than when it is nearer the axis. As it is specifically heavier than the wood, its inertia is greater, and it will require a greater force, or its equivalent, since the force in each case is equal, or a longer time, to acquire an equal velocity. Therefore, the wheel with the wood on the rim will pass the more swiftly down the inclined plane. On reaching the level it will be somewhat in advance of the other, but as its inertia enabled it more quickly to attain its highest speed, so it loses it the more readily, and the other soon commences gaining on it, but does not overtake it till after it has come to rest. Both will stop at precisely the same distance from the point of starting, since an equal impulse is given to each, viz.:—the weight of either, falling the perpendicular hight of the inclined plane.

Yours respectfully, H. H. S.

Hart's Village, N. Y., January 31, 1865.

[We think our correspondent is right in all respects except the relative positions at which the wheels will stop. Perhaps some of our correspondents will construct a pair of wheels as described and try them. Let them be precisely the same weight, size and form, constructed of wood and iron, but have the iron in one disposed around the periphery and in the other at the center. Then let them roll down an inclined plane and along a level floor, and see what will be their relative motions.—Eds.

### Wood-working Machinery Wanted.

Messrs. Editors:—We are at present making some enlargement and alterations of our works, and wish to improve the wood-cutting, etc., department. We know that America is far before any other country in that respect, and are anxious to get to know the chief inventions or machines in use in the States. We begin with the timber in the square log of 20 to 24 inches square, and from 18 to 24 feet long. The timber is St. John pine and birch; also haywood, etc. We make it into square pieces of 4 and 5 inches, and into boards, etc., and then into uses for machinery purposes. We have seen a great many machines of American origin, as for instance those supplied to the British Government, used at Enfield in the make of rifle barrels. We should be glad to receive from you the prospectuses of the various best makers of all kinds of wood-cutting machinery, and engravings or sketches. From these we could then select and write you again. Perhaps you can learn for us the terms on which we could then order any machines. We also wish to get a list of the best American works on engineering, wood-cutting, etc., and of scientific works generally, and to know how we could procure these books. J. Harrison & Sons.

Blackburn, Eng., Jan. 19, 1865.

[We trust that some of our enterprising manufacturers will furnish the information sought for by our correspondents.—Eds.

### Snow for Ice-houses.

Messrs. Editors:—There are many who would like the luxury of ice during the summer but who live where they cannot secure it without great expense, if at all. For their benefit I would suggest the use of

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compressed snow. It can be compressed into square blocks suitable for conveyance and packing by any simple contrivance, and will keep as well as ice, without more than ordinary precaution.

H. W. BLEYER.

Buffalo, Feb. 9, 1865.

### A Steam Carriage of the Olden Time.

MESSRS. EDITORS:—It has occurred to me that a description of a steam carriage which I saw some thirty years ago might be interesting to many of your readers, inasmuch as nothing has ever been publicly mentioned, to my knowledge, concerning it.

This carriage was made by a machinist in Brattleboro, Vt., and successfully worked as an experiment on the roads in that vicinity. It very nearly resembled a common one-horse wagon. The boiler was made of a series of 1¼ or 1½-inch tubes, bent in the form of an ox bow, or U-form, and so arranged that one branch served as the grate bars and the other branch as the roof of the fire place. The ends of the tubes terminated in two cylinders of from four to six inches diameter; the upper one being surmounted by another cylinder of larger capacity for a steam chamber. Two piston cylinders—3-inch pistons—worked harmoniously under the bottom of the carriage. These, by means of a short crank shaft, with a crank at each end and a chain wheel between, communicated motion and power to the hind axle by a chain belt and a longer chain wheel on the hind axle.

F. G. W.

Worcester, Mass., Jan. 25, 1865.

### The Names of the French Weights and Measures.

MESSRS. EDITORS:—In your interesting and valuable paper of the 28th ult. I read an article on the "Metric System." As I am an admirer of that excellent system I do not wish to see the terms which designate the French measure altered in such a way that they will sound as unmusical and gutteral as the Red man's tongue. By all means let us have the pure French names. Scholars, engineers, the people—all, will learn the true pronunciation, and, in the end, be more satisfied. I have ventured to call your attention and the attention of persons interested in a new system to the manifest error above named.

Although I am not a subscriber on your books yet I cannot do without your paper, and anxiously look for the succeeding number, wishing the while they came oftener.

CHAS. FRED. THOMAS, JR.,
Engineer U. S. Senate.

Washington, D. C., July 29, 1865.

### Aquaria Cement.

MESSRS. EDITORS:—Your correspondent wants a good cement for an aquarium. The following I have used five or six years:—

One part, by measure, of litharge; one part plaster of Paris; one part fine beach sand; one-third part fine powdered rosin; mix all together. This may be kept for years, while dry, in a well-corked bottle; when used, make in a putty with boiled linseed oil; a little patent dryer may be used; it will stand water at once, either salt or fresh.

A cheap aquarium is made as follows:—

Cut a narrow groove in a board the size you wish; set four pieces of glass on edge in the grooves; put a piece of zinc in the bottom; on the board make a light frame, the size of the top, with grooves; pass a small rod through the frame down the inside of the corners, through the bottom, and screw up tight; put the cement in all the corners, and you will have an aquarium at very trifling cost.

N. HALLOCK.

Queens, L. I., Feb. 6, 1865.

### Effect of the Earth's Cooling.

MESSRS. EDITORS:—The statement made in the subjoined article has created some little talk among certain circles in this vicinity, and there seems to be quite a diversity of opinion as to the Doctor's conclusions, among the most reasonable is this, that contracting the circumference of the earth would not shorten the time of revolutions on its axis; for two bodies of equal weight but of different dimensions, if removed from external friction, will revolve with equal force and velocity, as is proved by the falling of a feather in a vacuum; and as this mundane sphere is floating in ether which exerts no friction upon it, there would be no difference in its time of revolution if it were contracted to one-half or expanded to double its present size. Another says that the momentum of the earth's revolution would continue the same if its diameter were shortened, and hence its rotary motion must increase in the ratio of its concentration. You may see the practical effect of this law by the winding up of a revolving weight around your hand—like a sling. You may see the speed (of revolution) increase as the string shortens.

Now, as we do not presume to be philosophers enough to determine the actual fact, we beg to ask your decision, as you are conversant with these matters, either by letter or through the columns of your able journal.

W. E. P.

Boston, Mass., Jan. 30, 1865.

"We find in Ayer's American Almanac the remarkable statement that the temperature of the earth has not diminished more than 1-306th part of one degree Fahrenheit for 2,000 years. To our inquiry how he could make such an assertion, Dr. Ayer writes us the following answer:—'Hipparchus gives the exact record of an eclipse in his time. This enables us to measure with extreme accuracy the earth's diurnal revolutions since to any eclipse now. Diminution of its heat would by concentration shorten its axis, and consequently its time of revolution on its axis. The data show that this change has been only such as I state it, mathematically and indisputably true.'"

[The problem is very simple, and the position of the second gentleman is manifestly correct. If a revolving sphere contract in size, the matter at the surface will tend to preserve its velocity, and this will cause a greater number of revolutions in a given time.—EDS.

### Melting Platinum.

MESSRS. EDITORS:—Will you be kind enough to inform me whether any method has been found out to melt platinum. I have understood from one or two gentlemen from New York that it has been done with success, but they were unable to give me the modus operandi. Platinum exists in Peru in more or less quantities, and I am very anxious to know the new method of treating the ore, as it must be vastly cheaper than the old one, with nitric and muriatic acids?

GERRIT S. BACKUS,
Civil Engineer.

Lima, Peru, S. A.

[Platinum can be melted by the compound blowpipe. If it is to be melted in large quantities it should be first heated white hot, together with a fire brick on which it is to be melted.

Prof. Mapes tells a good story of his journey to see it done. One day he called on Dr. Chilton and asked the Doctor if he had seen the account of a man in Philadelphia melting large quantities of platinum. The Doctor said he had.

"Well," says Prof. Mapes, "take your carpet bag and let us go on and see how it is done."

They arrived in Philadelphia, and calling upon the man, who was a watchmaker, asked him if he would show them how he melted platinum in such large masses. The man answered very politely that he would. Then putting a fire-brick into his muffle, he invited the gentlemen to take seats for a few minutes. When the brick was white hot he took it out, placed his platinum upon it, and directing the blaze of his blow-pipe upon the metal, soon saw it glisten and run.

As the gentlemen came out of the shop Prof. Mapes remarked to Dr. Chilton:

"I say, Doctor, did you ever see two bigger fools than we are, to travel ninety miles to see a man heat a brick?"

Platinum is so very refractory that when melted on a brick that is white hot it will chill and harden before it runs off the brick.—EDS.

### The Track of an Army.

The track of an army is generally marked by desolation and suffering, and the evil effects attending the passage of armed men through a hostile country has been made the theme of more than one ambitious essay.

As our armies retake territory unlawfully held by the insurgents striking proofs of the intelligence and animating spirit of the individual soldiers of our armies is manifested. We are frequently in receipt of letters like the one subjoined:—

MESSRS. MUNN & CO.:—I have the honor to acknowledge the receipt of your communication, by which I learn that a patent has been granted to me on my rotary steam engine. I am indebted to your skill for the promptness with which you have proceeded in my case. I can heartily recommend your Agency and your paber to all my friends, or those who have any interest in the Patent Office or in the promotion of the useful arts. Very respectfully,

JOHN R. ELLIS,
Private, Co. F, 22d Wis. Vols., 2nd Brigade, 3d Division, 20 A. C.

Hardenville, S. C., Jan. 23, 1865.

### To Color Scarlet.

A correspondent of the *Prairie Farmer* thus speaks of her method of dyeing scarlet. Similar recipes have been frequently published in the SCIENTIFIC AMERICAN, but there are, doubtless, new readers who will be glad to learn the process:—

"Take one oz. cochineal, two oz. solution of tin, one half oz. cream of tartar. Take soft water enough to cover the goods, and make it boil, then add the cochineal. In five minutes after put in the solution to tin, and in five minntes more put in the cream tartar; then in five minutes more put in the goods, and boil till the water is clear. This is intended for one pound of yarn. Tin or brass kettle should be used.

"For coloring green, I put 2oz. indigo into 4oz. oil vitriol (sulphuric acid), about two weeks before I want to color; shake well every day. When ready for coloring, I make a strong decoction of black oak bark sufficient to wet what I design to color; to this add one pound of alum to every eight pounds of yarn, stirring until all the alum is dissolved. Then pour in the mixture of indigo till I think I have it of the shade desired. Then put in the yarn as much at once as I can—let it be over the fire 25 or 30 minutes; then lift it out to air a few minutes—return it to the kettle and let it simmer three hours, stirring it frequently. I think two ounces of indigo will color 10 pounds of yarn deep green and five pounds pale green. The pale green is managed in the same way, only use a less quantity of indigo."

### Facts concerning Shells.

The Pittsburgh *Commercial* says:—

"The shell department attached to the Fort Pitt foundery contains many curious and interesting things. The core of each shell is baked and varnished in the same manner as the molds for casting the guns. One good molder, with a helper, will cast from thirty to forty per diem of the 8-inch shells, and the establishment is capable of turning out on an emergency five hundred shells per diem. At present, however, they are only making about one hundred per day. Fifty tons of iron per week are used up in this department alone. Each shell, after being cast, is ground on an emery wheel, polished and hammered until it is perfectly round and smooth, qualities determined by gages, which are made with such nicety as to detect an inequality of the four-hundredth part of an inch on the surface. The interior of the shell is also gaged to determine its thickness, which must be of an exact regulation—as, for instance, one-and a-half inches in thickness for an 8-inch shell and two inches for a 10-inch. For these shells, when finished, Government pays but 6½ cents per pound, which is 3½ cents per pound less than is paid for a finished columbiad.

### SPECIAL NOTICE.

W. O. HICKOK, of Harrisburg, Pa., has petitioned for the extension of a patent granted to him on the 17th day of June, 1851, for an improvement in regulators for the pen beam in ruling machines.

Parties wishing to oppose the above extension must appear and show cause on the 29th day of May next, at 12 o'clock, M., when the petition will be heard.

FROM all quarters comes the intelligence that the present season's ice crop will be a very large and fine one. The present state of the labor market favors the securing of an unusual quantity.

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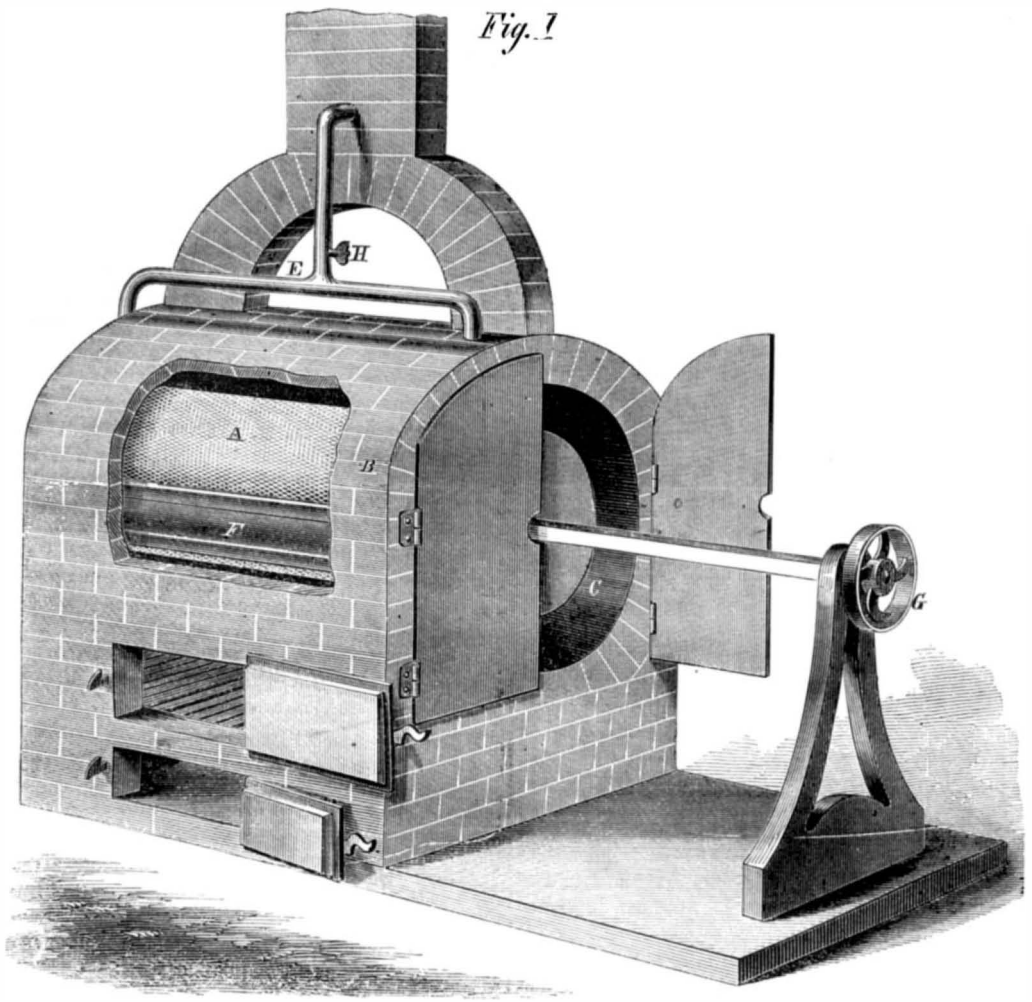
### Improved Coffee Roaster.

A cup of pure unadulterated coffee, made from berries properly roasted, is one of the most indispensable adjuncts of the breakfast table So far from being unhealthy, it is extremely wholesome, when taken in moderate quantities. It is both inspiring and stimulating, and has the additional merit of never being followed by the reaction or lassitude which characterizes alcoholic liquors or the wish-wash beverages of rye, etc., appropriately termed "war coffee." Much of the coffee ordinarily sold ready-roasted, has been improperly prepared, having been burned in the process, so that a bitter taste and bad color are imparted. Where this is not the case, the life or flavor of the coffee, which is contained in the essential oil of the berry, is driven off with the gases arising from the fire, so that while the appearance is uninjured the flavor is almost lost. It is claimed for he apparatus here illustrated that all these deleterious effects are avoided. That the coffee is roasted evenly throughout, that none of it is burned, and that the aroma is fully preserved. None of the gas arising from the furnace reaches the coffee, so that this injurious exposure, which is common to many coffee roasters, never occurs. The appended description will render the operation and construction of the machine intelligible to our readers (see Figs. 1 and 2). The canister, A, Fig. 1, which contains the coffee, is set in an oven or furnace, B, which is arched over; this furnace contains a metallic retort, C, around which the flames and heat from the furnace passes on its way to the chimney through the flues, D (see Fig. 2). In this retort the pipe, E, enters at top and bottom (Fig. 2). This is simply the plan of the apparatus. When the coffee is to be roasted it is put in the canister through the door, F. The outer doors are then closed, and the retort is heated to a dull red color, the canister, A, being put in motion meanwhile by a belt on the pulley, G. The retort is then full of the fumes and moisture driven off by the heat. To discharge these the damper, H, which has previously been closed is now opened, and the retort chamber freed. This fumigating process, so to speak, occupies about five minutes; at the end of this period, the aromatic flavor of the berry begins to evolve, and the damper, H, is closed. "The hot air of the retort," says the inventor, "carries the aroma up through the pipe, E, where it is cooled, so soon as it reaches the air, and falls into the retort, only to again circulate through the coffee, as it rotates, thus a complete circulation of the coffee in its own heated atmosphere is obtained which results in a superior article." The coffee is then removed by taking out the canister, as usual. We have seen samples of coffee roasted in this manner taken at random from the mass, which were evenly browned and free from burnt particles.

A great saving of time is claimed for this roaster, as it is said a charge can be thoroughly done in ten minutes, while the ordinary time is twenty or forty minutes. The canister is also preserved from being rapidly burnt out, since the fire does not reach it. A great saving of fuel is also claimed from the even distribution of the heat and its thorough circulation, while shielding the coffee from the coal-gas is of great importance. This roaster was patented on the 8th of October, 1861, by Henry E. Richards, of Bloomfield, N. J. [See advertisement in another column.]

Fig. 1




### RICHARDS'S COFFEE ROASTER.

### THE WAY TO RAISE BLACKBERRIES.

At the last meeting of the Farmers' Club, Dr. Ward described his plan of cultivating and training blackberries, and as it is a manifest improvement over the common method, we present a condensed report of his remarks.

The vines are planted in rows three feet apart, and three feet apart in the rows. Over each row is stretched a stout wire at the hight of about four feet, with stakes at proper intervals to support it at this hight. As the vines grow they are tied to the wire, and bent down along the wire all in the same direction—that is, all toward the south, all toward the north, or in such direction as may be most convenient.

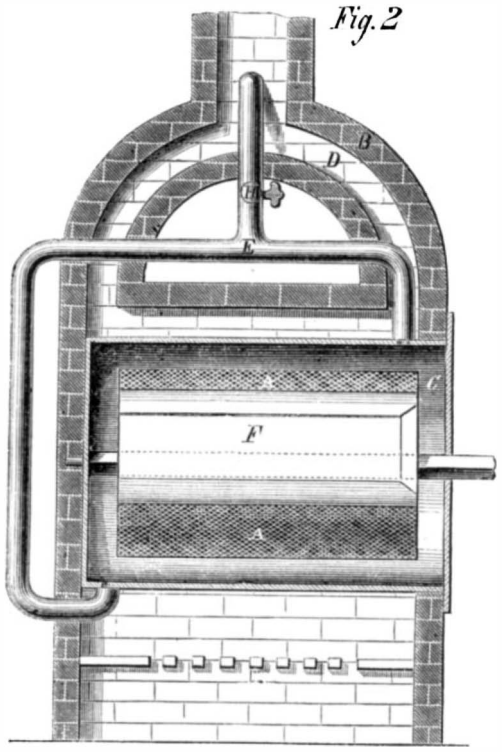
The berries are borne on the wood of the previous year's growth. In the Spring of each year, the bearing wood of the year before is cut out and removed, and the new shoots are tied to the wire, the lateral shoots of the new wood being at the same time cut back within a foot of the main stalk. Thus the whole labor of trimming and training the vines is performed at one operation. It is better to manure in the Fall, and this all-important matter should be attended to every year.

### HOLDEN'S SHOEMAKER'S VALISE.

This novel invention consists in combining a seat or work-bench, with a valise, so that the former may be folded up in the shape of the latter and used as a receptacle for garments, as well as a work-bench. The seat is not supported by the framing of the valise but by the legs, as shown, so that no part is unduly strained. These legs unscrew, and the whole, when folded, occupies no more space than an ordinary traveling valise. The nails, A, in the head of the one shown folded, come out when the legs are to be inserted, so that there is no external sign of the purposes for which it is intended.

All the tools necessary for a shoemaker can be carried in it, and it is useful for other mechanics as well as those of the class for whom it is shown as adapted in the engraving. For the disciples of St. Crispin, who follow the army, or for those itinerant shoemakers who go from house to house in the country, performing work for persons far from towns, this will be found a most useful article. Patented through the Scientific American Patent Agency, by S. B. and L. L. Holden, Jan. 31, 1865; for further information address Luther L Holden, *Herald* office, Boston, Mass.

Fig. 2



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VOL. XII. NO. 9....| NEW SERIES. |....*Twentieth Year.*

NEW YORK, SATURDAY, FEBRUARY 25 1865.

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## THE MATERIAL FOR HEAVY ORDNANCE.

As a general rule, when two ships meet upon the ocean, that one will conquer which has the most powerful artillery. Had the forts below New Orleans been provided with very large guns, they, as well as the city and the control of the Mississippi, would now be in the hands of the rebels. The possession of as powerful ordnance as that in the hands of any other people is a supreme necessity for us if we would maintain our position among the nations of the earth, or even if we would save our liberties from being crushed by superior force.

The necessity for heavy cannon has been fully recognized by our military and naval officers, and owing to their intelligent efforts the United States has been generally in advance of all other nations in this most important element of power, but within a few years the Prussians and Russians, and perhaps the English, have made a stride in advance of us. This has been effected by the use of a better material than that which we employ.

For guns not larger than the 68-pounder, extensive experience has shown cast-iron to be sufficiently strong, and as that is the cheapest material it will of course be employed. The smooth-bore 68-pounder for spherical shot has a bore of 8 inches, and is cast in our service with a weight of 8,465 lbs.

For guns larger than 68-pounders the one property of material which is difficult to obtain is strength. Among all the thousands of substances that are found on our planet or are produced by art, the strongest is cast-steel; and it is by the use of this material that the Prussians have surpassed us in the construction of heavy cannon. Until within a short time it was beyond the power of art to produce masses of steel properly forged of a sufficient size for large guns, but this difficulty is now overcome. From Mr. Holley's recent work on "Ordnance and Armor" we select the following remarks in relation to steel guns:—

"The mild steel made by Mr. Fried Krupp, at Essen, Prussia, is probably more remarkable than any other product of this nature, chiefly on account of the immense size of the solid masses produced. Mr. Krupp's cannon are, indeed, the only solid steel guns that have acquired a special celebrity, although it is probable that some of the Sheffield manufacturers make an equally good material, and will soon produce ingots of equal size. The first of Mr. Krupp's guns was the one in the great exhibition of 1851. Mr. Krupp patented this application of steel to ordnance in England, on Dec. 16, 1861. The great feature of this manufacture is the forging of large masses from single homogeneous ingots, without seams or welds. An ingot of 21 tuns weight, and 44 inches diameter, was shown at the Great Exhibition of 1862. Similar castings are forged every day into shafts, cannon, etc. The head of Krupp's heaviest hammer is said to weigh 40 tuns. The 9-inch gun, shown in the Exhibition of 1862, was at that time the largest cannon forged at this establishment, and by far the largest gun ever forged without welds. It was intended for a Krupp breech-loader, but is adapted to other plans of breech-loading or to conversion into a muzzle-loader by the simple insertion of a breech plug. It is a smooth-bore, and was intended for a 200-pounder to 250-pounder rifle. Its dimensions are—total length, 13 feet 8½ inches; diameter over chamber, 27⅜ inches; diameter at muzzle, 15½ inches; diameter of bore, 9 inches; weight, 18,000 lbs.; price, $10,125. Mr. Krupp is now making a large number of solid-steel guns for Russia; among them fifty 9-inch guns, of 18,480 lbs. weight and 15 feet length of bore, and a larger number of 8-inch guns, of 16,800 lbs. weight and 13 feet 2 inches length of bore, and of 6-inch guns of 8,900 lbs. weight and 10 feet 8 inches length of bore. They are all muzzle-loaders and rifled on the shunt plan. Mr. Krupp is also making for Russia several 11-inch guns, fitted with his own plan of breech-loading apparatus; and it is stated, though not officially, several 15-inch guns, at a cost of 87 cents per pound. Mr. Krupp expresses his readiness to fabricate 13 or 15-inch guns, and states that there are now no mechanical difficulties in the way. The breech of muzzle-loader of any size would be left solid, as the gun would be forged in the shape of a cylinder, and bored out. It may be remarked that the weight of forged masses of a given quality has been increased nearly ten times within a decade. Mr. Krupp sent a 5000-lb. block to the Exhibition of 1851, and one of above 44,000 lbs. to the Exhibition of 1862."

## YOUNG'S PARAFFINE OIL PATENT.

We have before us a copy of the decision of the Commissioner of Patents extending the patent of James Young for making paraffine oil, granted Oct. 7, 1850. There are two points in this decision which we do not think have before been settled, in the Patent Office, in extension cases.

The 15th section of the act of 1836 provides that in any suit for the infringement of a patent, the defendant may plead as a defense to the action that the patentee, being an alien, had neglected, for a space of eighteen months from the date of his patent, to put and continue on sale the invention or discovery.

The Commissioner decided that this question was one which ought to be determined by a jury, and that it would be an assumption of power on his part to declare a patent void on that account.

The second point urged against the extension was that Mr. Young had received adequate remuneration from his British patents.

The Commissioner decided that he had no right to take the profits from the foreign patents into the account. The law of our country makes no distinction between the rights of citizens and aliens; and in considering the question of profits arising from the sale of the invention here, the foreign interests could not be offered as a ground for refusing the extension. Mr. Young received a clear profit from his invention here of above $27,000. In Great Britain, it is understood that he has realized between two and three millions of dollars.

## SMALL MOTIONS.

No where do we find more palpable evidence of the value of well directed labor than in the mechanic arts. By severe mental exercise we can readily see that one step too much per minute gives so many unnecessary motions per hour, or per day, and that just so much time and strength has been misapplied.

Men perform great tasks sometimes without thinking of them, solely because they have become habituated to them. A practical application of the principle in question is to consider the loss of time and profit which arises from doing unnecessary labor in manufacturing goods of whatsoever nature.

A shrewd maker of saw mills in New Brunswick provides a traveling platform in his mills so that the workman is carried from the pile of timber to the saw back and forth, by mechanical means, he having only to stand still and take the timber and do his work at the proper time. This is not merely exemption from personal exertion, but a direct application of system, or *plan*, to the accomplishment of the end desired. So many movements are made by the table per hour, and if the workman is there he goes no faster or slower, but is doing just so much.

A roller in the Providence Tool Company's Armory makes gun barrels day in and day out. From the furnace to the rolls is but a step; but back and forth, twisting and turning, this man goes about his tasks and earns his bread literally by the sweat of his brow. The number of pounds of iron he lifts from the commencement of the day until its close is very great, and it would not only be a saving of his muscle, but greatly expedite the work if this breaking off from one motion to take up another, and changing the positions of the body a dozen times a minute were obviated.

We are no advocates of sedentary labor, of enforced tasks, of cramped positions. This does not follow what we urge by any means, for what we do deem necessary to the furtherance and full development of manufacturing interests is an organized plan or scheme by which, wherever it is practicable, postive results will be attained when the machines are kept running. This tends to the direct and positive improvement of every thing and interest concerned, employer and employee. As witness a case in point:—

In Germany scissors are made very cheap. One man cuts the steel, another forges a certain part, still another grinds the blades, another polishes, another fits up, and so on, until the work is done. From one machine to another there is a constant succession of stoppages, interruptions, transportations and changes. Work is often carried for miles from one branch of work to the other. What is the result? This; the workman earns about 40 cents per day.

But, says the economist, it only costs him 20 cents a day to live, so he earns just as much as our mechanics. Not so, for by an organized scheme, by the substitution of method for the absence of it, order for chaos, and a direct procedure by the shortest mechanical routes to the desired end, the prices obtained for labor by the German workman would be enhanced ten fold while the cost of his living would be precisely the same. It is very certain that in many of our workshops these hints might be heeded with advantage. They are the small leaks that sink the ship, and the petty losses which eat up profits.

## MUSEUM OF NATURAL HISTORY.

One of the most respectable and honorable scientific associations in the country is the Lyceum of Natural History, of this city. It was established in 1818; it embraces the most learned botanists, zoologists, mineralogists, and geologists of the community, and it has a rare scientific library, and a very large collection of objects in natural history. But the books and specimens are packed away in boxes for want of a suitable room in which to exhibit them.

By the reception of a circular, we see that an effort is to be made to raise a fund of from $50,000 to $75,000, to enable the society to hire a building for the display of the collection in a manner attractive and useful to the public.

We trust that this effort will be successful, and that it will be the commencement of a cordial co-operation of the wealth with the learning of our community, a union which will redeem New York from the reproach of having no interest but the accumulation of wealth, and will ultimately raise the city to the very highest position in science and every department of knowledge.

THE longest line of railway in the world is the Grand Trunk Railway, which extends from Portland to Quebec and the river Du Loup, east, to Sarnia, at the foot of Lake Huron, west, with several branch lines, including a total of 1396 miles under one management. It is to be further extended to Chicago, in a direct line from Sarnia, by way of Lansing, the capital of Michigan, a distance of 320 miles—making a total of 1716 miles in all.

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## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

*Apparatus for Producing Gas for Heating and Illuminating Purposes.*.—This invention is an improvement in the mode of and apparatus for producing gas for illuminating and heating purposes, parts of which improvements are also applicable for increasing the illuminating and heating power of ordinary lighting gas; it relates to an improved mode of combining or impregnating ordinary atmospheric air with such a quantity of volatile hydrocarbon as will render it a combustible and illuminating gas, which may be burned in any suitable burner for heating purposes, or in ordinary gas burners in place of the ordinary carburetted hydrogen for lighting purposes. It is also applicable for carbureting ordinary illuminating gas, and by that means increasing its lighting power, which is accomplished without causing the gas or air to pass through the liquid hydrocarbon and without the use of a wick, but by causing a current of air or gas, under a suitable pressure, to pass through a vessel containing a porous mass, or material which is kept saturated with any suitable hydrocarbon. W. H. Buckland, of London, England, is the inventor.

*Bolt Machine.*—This invention relates to a machine which is used for making that kind of bolts, spikes and rivets where one end of the iron or other material used is upset to form the heads. The various improvements consist in the use of vertical slides carrying at their lower ends changeable dies which are provided at their lower surfaces with cavities corresponding with the size and form of the heads required. The heading tools are changeable and adjustable in a movable carriage or carriages and they are provided with holes or sockets corresponding with the body or shank of the bolt. The carriages are moved horizontally in order that the operative may conveniently place the block or remove the bolt, spike or rivet when completed. The articles after having been operated upon by the header, are partly removed from the heading tools by suitable levers, and india-rubber or other suitable springs are introduced in order to furnish a yielding bearing necessary for the safe working of the machine. The different parts are so arranged that two or more machines may be combined in one frame and that whilst one side of the machine is used for making nuts, the other side may be used for making bolts, spikes or rivets, or the machine may be used for making different kinds of bolts of different dimensions at the same time. For the sake of cheapness the heading tools and dies are made of cast iron with chilled surfaces. J. Watkins, of the London Works, Birmingham, Eng., is the inventor.

*Dresser Reed.*—Dresser reeds, or reeds used for weaving purposes, are generally made just long enough to fill a beam of a certain length, but it frequently happens—in fact it is invariably the case—that there is so much variation in the length of the center beams that it is very difficult to fill or guide the yarn on them evenly, some of the beams being too short and some too long. This difficulty is obviated by the present invention, which consists in a reed for dressing or weaving purposes, which is made elastic, or arranged in such a manner that it can be expanded and contracted, and that it can be adapted to beams of different lengths. Ambrose J. Nichols, Providence, R. I., is the inventor.

*Cigar Machine.*—This invention consists in an adjustable mold, in combination with a longitudinally-sliding revolving fork, in such a manner that the filler can be readily placed on the mold and pressed, and by the action of the revolving fork the wrapper can be applied while the filler is in the mold, and the cigar can be finished entirely by the machine in little time. J. Thompson, No. 147 East Twenty-fifth street, New York City, is the inventor.

*Loom for Double-faced Tissue.*—This invention relates to the manufacture of a double-faced fabric or tissue, consisting of a combination of plain or figured and of velvet parts, the velvet presenting the peculiarity of having a plushing or pile on both faces or sides of the tissue, this pile or plushing being either cut or uncut, viz.: forming either an ordinary plushing or a plush or shag. Pierre Joyot, Jr., of Paris, France, is the inventor.

## ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 14, 1865.

*Reported Officially for the Scientific American.*

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

46,317.—Process for Disinfecting Noxious Vapors.—William Adamson, Philadelphia, Pa.:

I claim the use for disinfecting or deodorizing the fumes arising from burning, boiling or fermenting animal matter, of the products of combustion of spent tanbark, old leather, or other material containing tannin, as set forth.

46,318.—Method of Treating Offal.—Wm. Adamson, Philadelphia, Pa.:

I claim utilizing offal by draining, drying and disinfecting it, substantially in the manner described.

46,319.—Butter Mold.—Oliver Allen, San Francisco, Cal.:

I claim a butter mold, constructed and operating substantially in the manner herein shown and described.

[This invention consists in forming a mold by which butter may be divided into parcels of such a shape and quantity as are required in preparing it for market, the mold being varied in size and shape to suit the demand of the fancy which prevails in different communities or markets.]

46,320.—Hot-air Engine.—Cyrus W. Baldwin, Charlestown, Mass.:

I claim, first, Guiding a flexible disk valve, substantially as described.

Second, Also the employment of a secondary furnace, in combination with the primary furnace, and the cylinder of a hot air engine, when located so that the products of combustion from the primary furnace go through the secondary furnace on their passage into the cylinder, substantially as and for the purpose set forth.

Third, And the arrangement in the furnace, in connection with a suitable opening or openings through the wall thereof, into the air conduit pipe, of a perforated movable air-passage ring, so as to be interchangeable with the movable lining rings.

46,321.—Plow.—E. Ball, North Manchester, Ind.:

I claim a cast-iron plow beam, of curved form, longitudinally and transversely, and the lower and rear part having a straight portion or surface for the attachment of the share and mold board, substantially as shown and described.

I further claim attaching the land side, D, to the beam, by means of the dovetail, e, at its front end, and a bolt passing through the land side, and a flange, f, at the rear of the beam, as set forth.

[This invention relates to an improvement in that class of plows in which a cast-iron beam is employed, and it consists in casting said beam of concave form at its land side, whereby strength with lightness is obtained, and the point or share attached to the beam with greater facility than hitherto.]

46,322.—Snow Plow.—Willard N. Ball, LaPorte, Ind.:

I claim, first, The scrapers, C C, in combination with the rotary shovels, F, arranged and applied to a car or truck, to operate in the manner substantially as and for the purpose set forth.

Second, The rotary shovels, V, arranged in relation with the shovels, F, and to operate in connection therewith, substantially as and for the purpose specified.

Third, The arrangement of the shovel, V, substantially as herein shown and described, so that the same may be capable of being folded and expanded, as set forth.

Fourth, The slide, U, and links, Y, arranged as shown, for folding and expanding the shovels, V.

Fifth, The reversing gear, M M, when applied to and used in connection with the gear of the rotary shovels, F V, for the purpose set forth.

Sixth, The combination of the rotary shovels, F V and scrapers, C, when arranged to operate substantially as and for the purpose specified.

[This invention relates to a new and improved plow for cleaning railroad tracks of snow, and it consists in the employment or use of rotary shovels, in connection with scrapers.]

46,323.—Machine for Drying Tobacco.—John H. Balsley, Dayton, Ohio:

I claim, first, A machine constructed as herein described, for subjecting fine and common cut tobacco to an agitating and separating action, and at the same time to a current or currents of air, said air being heated, rarefied in the common way, all substantially as described and set forth.

Second, The rotating cylinder, B J, in combination with a fan box, F, and endless apron, E, arranged and operating substantially as described, for the purpose set forth.

46,324.—Buckle.—Isaac Bannister, Newark, N. J.:

I claim the combination of two buckles acting upon one center bar, in contrary directions, from the center, the upper tongue resting upon the top of the frame, and the other tongue resting under the under frame, as set forth, and for the purpose named above.

46,325.—Mode of Adjusting Circular Saws on their Arbors.—John Barnard, Alton, Ill.:

I claim, first, So applying a saw to an arbor, having a screw thread cut on it, that the saw, together with its clamping collars, can be adjusted and set at any desired point on the arbor, substantially as described.

Second, The combination of laterally-adjustable clamping collars, C C', with jamb nuts, B B', when the latter are fitted to work on an arbor, having a screw thread cut on it, substantially as herein described.

46,326.—Buckle.—John Bavier, Newark, N. J.:

I claim a buckle with a tongue or tongues that operate by turning outward, at the ends of the buckle, constructed substantially as shown.

46,327.—Washing Machine.—Edward Burke, Philadelphia, Pa.:

I claim the combination of the following parts, the washer, g, in connection with the handle, C C', clamp, b b, bar, f, axles, K and K, by metallic fixtures in slots in uprights, C and C, in combination with platform, A a', india-rubber bands, h and h, and washboard, A, placed on an inclined plane, for the purpose specified.

46,328.—Steam-heating and Fire-extinguishing Apparatus.—Charles S. Brown, New York City:

I claim the combination of the steam engine, boiler, pump and steam heating pipes, arranged substantially as described, so as to be utilized to convey water to extinguish fires, in the manner set forth.

I also claim connecting to the steam heating pipes a pipe to supply water from a hydraulic engine or pump, or other source, and force it through said steam pipe, to extinguish the fire in or around the building heated, substantially as shown and described.

I also claim, in combination with the steam heating pipe or apparatus, and water supply pipe, a stop cock, or valve in the steam pipe, between the boiler and the junction of the water pipe with the steam pipe, to stop the water from running toward or into the boiler, which supplies the steam to the heating pipe, substantially as shown and described.

46,329.—Sight for Ordnance.—James Brady, U. S. Vols., Philadelphia, Pa.:

I claim, first, The combination of the movable sight, G, with the standard bars, E E, for the purpose set forth.

Second, The combination of the sight, H, with the extension bar, F, for the purpose set forth.

46,330.—Machine for Making Buttons.—Henry Book, New York City:

I claim the arrangement and combination of a presser bar or plate, H, above the die block, provided with a slot, n, to receive the eye of the button, and operating in the manner and for the purpose substantially as described and set forth.

46,331.—Device for Cutting and Shaving Ice.—S. E. Blake, Worcester, Mass.:

I claim the rotary cutter disk, F, in combination with the follower, K, operated by the elastic spring, L, by which the ice is held up to the cutter, the whole inclosed in a box or case, substantially as described and represented

46,332.—Paper Collar.—Wm. S. Bell, Jr., Boston, Mass.:

First, I claim doubling the thickness of this band and cementing the folds together, substantially in the manner set forth.

Second, Folding the collar upon the line, b, by making the edge, a, the guide in such operation.

44,333.—Mode of Raising Sunken Vessels.—Thomas Bell, Bellport, N. Y.:

First, I claim the camels or floats, constructed with transverse beams, d, and adapted to receive the stem or stern of a vessel, in the manner herein described.

Second, The pipes, i i, in combination with floats, A A, of the construction specified for the lifting chains to work through, substantially as and for the purpose herein specified.

Third, The braces, k k, applied in combination with the floats, A A, substantially as and for the purpose herein set forth.

Fourth, The attachment of the chains to the vessel to be raised by means of plates, n n, secured to the vessel by screws, substantially as herein described.

[This invention consists in a novel form and construction of the floats employed for raising vessels, whereby they are better enabled to be kept in place; also, in a novel system of iron pipes passing through the floats, for the reception of the lifting chains, whereby the slipping of the said chains is prevented, which occurs when they pass over the edges of the floats; also in a novel system of rigid braces for keeping the vessel upright in the floats when partly raised, or when a portion of it is above the surface of the water; and further, in a novel system of plates for attaching the chains to the vessel.]

46,334.—Caster for Furniture.—Rowland J. Beardsley, Brooklyn, N. Y.:

I claim a wheel caster, having a screw thread on the outer surface of the socket which receives the revolving spindle, when this spindle is passed through the socket and attached thereto by means of a head formed on its upper end, as herein described.

46,335.—Mode of Operating the Swell of Melodeons.—Daniel Clark and Thomas Stevenson, Buffalo, N. Y.:

We claim operating the swell of melodeons and other similar musical instruments by means of the bellows pedals, substantially as described.

46,336.—Car Coupling.—Charles Clinton, Blooming Grove, N. Y.:

I claim the two jaws, D D, arranged within the draw head, A, substantially as shown, and operated by the gravitating levers, E F, pivoted respectively to the upper journal, e, and at f, and by a link to the other journal, e, the said levers being shackled together by the link, G, the whole arranged substantially as described and represented

I further claim the socket and spring, B, in combination with the shackle or pin, H, and jaws, D D, all arranged substantially as and for the purpose specified.

46,337.—Machine for Making Nuts.—P. Coleman, Philadelphia, Pa.:

I claim the combination of the wheel, A, projecting cam, B, lever, C a, slide, F, and spring, G, when constructed, arranged and operating as herein specified.

[This invention consists in the employment or use of a slide arranged and applied to the machine in such a manner that the slide will be thrust forward in the path of the nut so as to serve as a stop or bearing for the same, and cause it to be held or placed in a proper relative position with the punch, while the latter descends and punches the hole, the slide then receding to allow the punched nut to be moved or shoved out of the way, and then again moved forward to serve as a stop for a succeeding nut.]

46,338.—Railroad Switch.—Marcellus V. Cummings, Winthrop, Maine:

I claim the two frog bars I I', bent or L shaped levers, E G, connected with the frog bars and the switch rails, substantially as and for the purpose herein set forth.

I further claim the suspended arms, K K', arranged respectively with the bar, F, and lever, J, substantially as and for the purpose specified.

[This invention relates to a new and improved railroad switch of that class which is commonly termed self-acting—that is to say, is set by the train itself so as to form a connection with the rails of the track on which the train is to pass.]

46,339.—Tool for Scaling Tubes to Boilers.—John Daley and Joseph H. Marville, Philadelphia, Pa.:

First, We claim the combination and arrangement of the cutters, a b, in the cutter stock, A, the cutter stock being operated by the central screw shaft, C, substantially as herein set forth.

Second, The combination and arrangement of the circular cutter, B, with the cutter stock, A, substantially as and for the purpose set forth.

Third, The combination of the guide, D, with the screw shaft, C, arranged in relation to the tubes, substantially as and for the purpose set forth.

Fourth, The combination of the guide, F, with the screw shaft, C, substantially in the manner described and for the purpose specified

46,340.—Machine for Making Paper Collars—M. P. Dorsch, New York City:

I claim the reciprocating feeding frame with the sides thereof grooved to receive the sheet of paper, in combination with the griping fingers, substantially as described, and having a mode of operation such as described and for the purpose specified.

And I also claim the reciprocating feeding frame with its griping fingers, operating substantially as herein described, in combination with the dies for embossing and cutting the collars, substantially as described.

46,341.—Construction of Railway Cars.—Davis H. Dotterer, Philadelphia, Pa.:

First, I claim a car body which is composed of successive horizontal layers or strips of wood, secured one upon the other by means of cement and metal clamping rods, c c, substantially as described.

Second, The use of tubes, a a, in combination with the clamping rods, c c, and a car body, constructed substantially as described.

Third, Constructing a car body of two or more sections, put together in such manner that they can be separated at pleasure, substantially as described.

Fourth, The method of applying the links, e e, to the ends of the sections of a car body substantially as described.

46,342.—Operating Ordnance.—James B. Eads, Saint Louis, Mo.:

I claim, first, Supporting a gun of two different points in it

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length by a combination of devices on a gun carriage acting in connection with each other in such a manner as to rigidly compel the gun whenever it is moved in a vertical plane to rotate about a point in advance of said devices and at or near its muzzle.

Second, Controlling the horizontal movements of the chassis or lower carriage which supports the gun carriage by a combination of devices acting in connection with each other upon the chassis at two different points in the length of the latter in such a manner as to rigidly compel its longitudinal axis to rotate about a point in advance of the chassis and the devices which control its movements, so that the center of rotation may be on the exterior of a defense wall, while the devices are on the inner side of it at some considerable distance from the center of rotation.

Third, The use of the axis 6, figure 1, at a point not the center of rotation of the chassis when used in combination with other devices for the purpose of producing a center of rotation for the chassis at a different point from said axis.

First, The use of axis 6, figure 1, at a point not the center of rotation of the chassis when used as a channel for the conveyance of power to operate the gun.

### 46,343.—Watch.—Charles W. Fogg, Waltham, Mass.:

I claim attaching one of the pinions of the train to its arbor by means of a screw thread, substantially as set forth, for the purpose specified.

### 46,344.—Seeding Machine.—Clinton Foster, Prairie City, Ill.:

I claim, first, The main wheels, B B, which revolve upon the hollow fixed axles, with the flanges, b, that open the furrows to receive the seed through the open spaces, c, between the flanges, b b.

Second, The hollow axles, E E, in combination with the sliding rod, M, screw shafts, F, and circular disks, I, all arranged to operate substantially as and for the purpose specified.

Third, The circular disks, I, in combination with the wheels, B, the latter being provided with spaces, C, and the former provided with notches, e, all arranged substantially as and for the purpose set forth

[This invention consists in placing the seed boxes and seed distributing devices within the wheels of the machine, and pressing the seed into the earth by means of circular rotating disks, which are also placed within the wheels and operated from the latter, all being arranged in such a manner as to form a very simple and efficient device for planting seed either in hills or drills.]

### 46,345 Artificial Teeth.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim the combination as well as the arrangement of the metallic guard-plate, C, the vulcanite, D, and the metallic inner plate, B, applied to artificial teeth substantially as specified.

I also claim the combination of the series of tapering holes, b or c, with the aluminum plate in which they are formed, the vulcanite and the artificial teeth, substantially as specified.

I also claim as of my invention and as an improved manufacture, a set of any suitable number of artificial teeth and one or more aluminum plates combined by means of a composition, as hereinbefore described, or its equivalent.

### 46,346.—Artificial Teeth.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim the improved manufacture of aluminum suction plate for dental purposes—that is, with holes and hooks or staples combined with it, and made by means substantially as specified.

### 46,347.—Combination of Alloys of Aluminum with Vulcanite.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim, first, The combination of an alloy of aluminum with vulcanite, when the said alloy is used as means of attachment to or in contact with vulcanite, or as a means of attachment to other material exposed to the vulcanizing process.

Second, I claim the combination with vulcanite of metals coated or plated with aluminum or its alloys, in which the said coating or covering is in contact with the vulcanite or exposed to the process of vulcanization.

### 46,348.—Parallel Ruler.—G. C. Gillette, Richfield, British Columbia:

I claim, first, The levers, d d d' d', joined together by the cogged bars, e e, in combination with the bars, A A', of a parallel ruler, constructed and operating substantially in the manner and for the purpose herein shown and described.

Second, The graduated limb, c, applied in combination with the two parts of the parallel ruler, substantially as set forth, for the purpose of laying off vertically the same distance, which can be measured horizontally on the bar.

[An engraving and full description of this invention will be published in a few weeks in the SCIENTIFIC AMERICAN.]

### 46,349.—Cultivator.—Samuel Gulick, Kline's Grove, Pa.:

I claim the frame, D, fitted on the axle, A, and connected by chains or cords, E E, to fast pulleys, F F, on a shaft, G, which has its bearings on uprights, C C, attached to the axle, and which serve as guides for frame, D', all being arranged as shown, with a lever and notched bar, or their equivalents, whereby said frame may be raised and lowered bodily and secured at any desired hight, for the purpose specified.

I further claim the pivoted bars, Q Q, when applied to and used in combination with the adjustable frame, D, substantially as and for the purpose set forth.

[This invention relates to a new and improved Cultivator of that class which is furnished with adjustable plows, and it consists in a novel arrangement of parts whereby it is believed that advantages are obtained over others now in use, as regards facility in operating or adjusting the plows.]

### 46,350.—Bread and Meat Slicer.—John D. Hall, Philadelphia, Pa.:

I claim the combination of the rotary cutter, C, with the cam, K, and feed gage, H, for the purposes specified; and in combination with the above, corrugating the interior surface of the trough, D, for the purpose set forth.

### 46,351.—Windlass for operating the Center-Boards for Vessels.—Josiah C. Hamilton and Henry W. Hamilton, Washington, D. C.:

We claim the application and arrangement of a conical screw drum on the deck or other place of a vessel in combination with the center-board whereby the slack to the rope or chain produced by the buoyancy of the water pressing the board upward is taken up by the increased surface of the drum in its revolution, substantially in the manner described.

### 46,352.—Turning Lathe.—Nathan Harper, Newark, N. J.:

I claim, first, The use of slides carrying cutters having free play in a plane at right angles to the axis of the stuff or thing being cut, in combination with springs and shaping bars.

Second, The use of a compound sliding rest, consisting of a slide carrying a cutter that moves in a straight line parallel with the center of the thing being cut, in combination with a slide or slides carrying a cutter adapted to move in a plane at right angles to the axis of the thing being cut or shaped.

### 46,353.—Machine for Making Book Covers.—James W. Harrison, Washington, D. C.:

I claim, first, The gage, the same being so constructed as to form a box or receptacle to contain a quantity of back linings, and so operated as to place them automatically one at a time in the "case," at the same time the gage is in its position for placing the pasteboards as described, for the purpose herein set forth.

Second, I claim, in combination with the adjustable back gage, the adjustable automatic folding wings, the same being operated by cams, or foot pedals, levers and springs, for the purpose of turning over and securing the cloth on the "cases" in making book covers, as herein specified.

### 46,354.—Mode of Ornamenting.—Henry Harrop, Greenwich, N. Y.:

I claim the mode or process, substantially as herein described and set forth, for ornamenting or decorating articles of manufacture.

### 46,355.—Cultivator.—Samuel Henry, Chenoa, Ill.:

I claim the arrangement of the levers, J J, connected by straps, h, to the pivoted frame, F G, and by pendants, K K, to the plow beams, L L, which are hinged to the axle, the said frame, F G, being further capable of lateral deflection by pressure of the feet of the driver, substantially as and for the purposes described.

[This invention relates to a new and improved cultivator of that class which are provided with adjustable plows which work laterally for the purpose of admitting of the plows being moved in the direction specified in order to conform to the sinuosities of the rows.]

### 46,356.—Box Traps for Animals.—Benjamin B. and John R. Hill, Worcester, Mass.:

I claim the locking catches, D D D D, when constructed and operating in the manner and for the purposes above set forth.

### 46,357.—Carpet Stretcher.—N. Hill, Caton, N. Y.:

I claim the combination of the duplicate extension bars, B B', provided with bands, C C C C, and locking pins, D D, with the spur blocks, A A', whereby I secure the required range and efficiency as well as compactness for transportation, substantially as described.

### 46,358.—Pencil-point Protector and Mark Eraser.—Jas. B. Hodgskin, New-York City:

I claim the pencil-point protector and pencil mark eraser made by combining the sleeve or band, B, provided with inwardly projecting groove or equivalent internal projection or projections with the rubber eraser, C, substantially as herein described, as a new article of manufacture.

### 46,359.—Barrel for holding Petroleum and other Oils.—James Holland, Conshohocken, Pa.:

I claim a barrel composed of the outer casing, A, and the inner casing, B, in combination with an intervening body of cement or equivalent material, substantially as specified.

### 46,360.—Pump.—Nicholas Hotz, Brooklyn, N. Y.:

I claim the sliding rods, C C2, guides, D, links, N' N2, and arms, c' c2, in combination with the hand lever, M, and the two movable valve boxes, B' B2, all arranged and operating together, as herein set forth.

### 46,361.—Attachment for Washboard.—Charles H. Hudson, New York City:

I claim, first, The changeable or folding washboard mechanism herein described, the standards, B B, being hinged to the sides of the washboard by means of pins, b, standing in the slots, a', adapted to fit over, c, to hold the parts rigidly, or release them for folding, when desired, substantially as and for the purpose herein set forth.

Second, The bracketed plates, G I G I, hinged on the arms, E E, rigidly connected together by the brace, J, and carrying two or more rollers, H H, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in a rubbing attachment for washboards, which was patented by this inventor February 16, 1861. The object of the present invention is to render the device more convenient for transportation than hitherto, and also more durable, and capable of being attached to any of the ordinary washboards now in use.]

### 46,362.—Plow.—D. F. Humphrey, Saline, Mich.:

I claim the movable or adjustable landside, C, provided at or near its forward end with a hook which engages with a hole in the landside, A, and fixed adjustably in a verticle slot in the latter, by means of the notches, g, the notched washer, e, and the screw bolt and nut, c f, as described and represented.

[This invention consists in providing a plow with a movable or an adjustable landside, arranged in such a manner that the point of the share may have more or less pitch or rake given it, as may be required.]

### 46,363.—Burner for Lamps and Lanterns.—John H. Irwin, Chicago, Ill.:

First, I claim the employment of two or more wicks, arranged and operating as shown and described, in combination with a single slotted cone, substantially as and for the purposes herein specified and shown.

Second, I claim providing the wick tube with the partitions, a', as and for the purposes specified.

Third, I claim the combination of two or more wick regulators, E' and F, as shown and described.

### 46,364.—Seed Planter.—John F. Keller, Greencastle, Pa.:

First, I claim the above-described inelastic roller, in combination with the elastic roller, as a pair of feed rollers for wheat drills or other seed planters, substantially as set forth.

Second, I claim the peculiar adjustable gage piece, H, the same being provided with a point fitting down between the tops of feed rollers, substantially in the manner and for the purposes set forth.

Third, I claim the solid or cast-iron slide, with tips or points fitting down between the tops of the rollers, substantially in the manner specified.

### 46,365.—Arm Supporter for Riflemen.—Seth Kinman, Humboldt, Cal.:

First, I claim an arm supporter and rest, constructed and operating substantially as herein set forth and described.

Second, The combination of the base or band, A, and bars, E and F, constructed as described.

Third, I claim the bar, F, provided with an arm piece, D, and jointed to a support, E, in such a manner that said bar may be fixed as a rigid support for the arm, or made to vibrate freely, as required, substantially as set forth.

### 46,366.—Railroad Car Brake.—J. W. Latcher, Northville, N. Y.:

I claim the employment or use of the rocking or oscillating plates, B B, placed on suitable centers, and longitudinally to the truck, and centrally between and in front of the wheels, and actuated by means of the links, C C, toward each other and against the wheels, in the manner and for the purpose substantially as described.

Second, I claim the use of the toggle links, C C, in combination with plates, B B, for the purpose of rocking or actuating the plates, B B, as set forth.

### 46,367.—Water Wheel.—Joseph F. Letellier, Grand Rapids, Mich.:

I claim a horizontal water wheel, provided with a scroll, having its bottom formed of a spiral plane longitudinally, and inclined transversely, in combination with the inclined buckets of the wheel, all arranged substantially as herein set forth.

[This invention relates to a new and improved water wheel, of that class which are placed on vertical shafts and have the water admitted to them through a scroll, the water acting upon or against the buckets of the wheel, upward from the scroll, the wheel working upon the top of the latter.]

### 46,368.—Condenser and Refrigerator.—Wm. A. Lighthall, New York City:

I claim the combination of the case, A, tubes, B, and division plates, C, with the nozzles, D and E, for the reception and delivery of the cooling water, and the nozzles, F and G, for the reception and delivery of the injection water, when the said nozzles are arranged in relation to each other, and to the case tubes and division plates, as and for the purpose herein set forth.

### 46,369.—Stovepipe Thimble.—Thomas M. Lozie, Elmira, N. Y.:

I claim a stovepipe thimble, composed of a series of rings, B C D, and register, E, fitted together by hooks or projections, d c f, and corresponding nicks, d e f, substantially as and for the purposes set forth.

[This invention consists of a thimble, composed of a series of rings, decreasing in size, and a register in the center, fitted together by means of hook projections secured to the inner surfaces of the several rings, and arranged, in combination with nicks, on the inner peripheries of the next preceding rings, in such a manner that when it is desired to remove the register or either of the rings it has to be turned until the projections on its inner surface come opposite the nicks on the inner periphery of the next larger ring, and thereby the thimble can be readily adjusted to pipes of different size, and when no stove is used the register is inserted, and the hole in the wall can be opened or closed, as may be desirable.]

### 46,370.—Machine for Making Wrought-iron Railroad Chairs.—John H. Malbett, Mechanicsville, N. Y.:

I claim the employment of the said upper and movable die, F, and the said lower and fixed die, E, and said vertical moving center die, C, operating within said fixed die, E, each constructed and combined in the manner and for the purposes substantially as herein described and set forth.

I also claim the said vertical-moving center die, C, in combination with the said lower and fixed die, E, and with the cam, D, in the manner and for the purposes substantially as herein described and set forth.

I also claim the cutting and punching in the said prepared chair plate or bar, the said plate or recess, by means of the said die or punch, e, or its equivalent, so as to allow the said inner and outer lips to be cut, punched, swedged and formed from said chair plate or prepared bar, in a more quick, easy and substantial manner, substantially as herein described and set forth.

I also claim the combination of the cam or eccentric, D, with the moving vertical center punch or die, C, substantially in the manner and for the purposes herein described and set forth.

### 46,371.—Machine for Rolling Metal.—Henry F. Mann, Pittsburgh, Pa.:

I claim the use of two supporting rolls, or their equivalent, placed with their surfaces in contact with small diameter-working rolls placed above the upper small diameter-working roll, and below the lower one, whether an intermediate roll of larger diameter is used or not, for the purpose of supporting working rolls of small diameter for rolling metallic sheets, bars or plates, substantially in the manner hereinbefore described.

Also the use of two small diameter rolls, in combination with an intermediate roll of larger diameter, the small diameter rolls being supported as hereinbefore described, the term small diameter being used relatively to the diameter of the larger roll, and not as otherwise limiting or defining the diameter of the smaller rolls.

### 46,372.—Machine for Dressing the Throats in Plane Stocks.—F. B. Marble, Columbus, Ohio:

First, I claim the combination and arrangement of the rotary traveling cutter, N, and oblique adjustable rest and clamp, j t, substantially as and for the purposes described.

Second, The application of the gage, k, to the vertical face of the pivoted rest of a machine for planing the throats of plane stocks, substantially as and for the purposes described.

Third, The rotating planing cutter, N, with cutting edges on its periphery and on its face, arranged and operating substantially in the manner and for the purpose described.

Fourth, The combination in a machine for cutting the throats of plane stocks of the rest, j, gage, k, clamp, t, horizontally adjustable bed, H, vertically adjustable table, G, and a traveling cutter, constructed and operated substantially as described.

Fifth, The pivoted-adjustable clamping rest and gage, j k t, constructed and operated substantially as and for the purposes herein described.

Sixth, The adjustable stop gage, c, applied to a frame, A, in combination with a traveling rotary cutter, N, and stock-holding bed, H, substantially as and for the purpose described.

### 46,373.—Harvester.—Chas. W. and Wm. W. Marsh, Clinton, Ill.:

We claim the scalloped gatherer, D, provided with the hinged extension, d, as described, when used in connection with the band, B, substantially as and for the purpose specified.

We further claim the scraper, E, for the roller, C, when constructed as described, and used with the endless band, B, for the purpose specified.

### 46,374.—Machine for Hulling and Cleaning Grain.—John M. Mayer, New York City:

I claim the revolving perforated cylinder, A, with circular shelves, E, in combination with the semicircular conduits, d, and case, F, constructed and operating substantially as and for the purposes set forth.

[This invention consists in a revolving wire gauze cylinder, provided with a series of circular rough surface shelves, in combination with an internal fan blower, and with an external case, provided with a series of semicircular conduits, arranged in such relation to the circular rough surface shelves of the wire gauze cylinder that the wheat or other material dropped in the first shelf passes to the second and third, from the third to the fifth, and so forth, and from the second to the fourth, and so on, and in its course over the several rough surface shelves it is thoroughly divested of its peel, and discharged in a comparatively pure state.]

### 46,375.—Toe Piece for Lasting Machine.—A. S. McIntire and Nathanial Stevens Thompson, Stoneham, Mass.:

I claim the method of forming a toe piece for lasting machines of any suitable material, by means of the lasted shoe and the jaw lasting machine, substantially and for the purpose as herein described.

### 46,376.—Cultivator.—Elias Minnich, McKee ½ Falls, Pa.:

I claim the arrangement of the braces, M M, connecting the plow shares to the tongue, with the teeth or rake, L, as arranged and combined with the angular-shaped frame, E, as herein described and for the purposes set forth.

### 46,377.—Mode of Hanging Gates.—Thos. S. Minniss, Meadville, Pa.:

I claim the gate, A, shifting lever, I, and cords, O, the several parts being constructed, arranged and operating as and for the purpose set forth.

### 46,378.—Gang Plow and Cultivator.—Saml. H. Mitchell, El Paso, Ill.:

I claim the split and expanded draught pole, C, in connection with the axle, A, and bar, E and O, and rods, h, all arranged as and for the purpose herein set forth.

[This invention relates to a new and improved device for plowing, cultivating, etc., and it consists in a peculiar construction of the framing of the machine, and the attachment of the plows thereto, whereby the plows may be readily raised and lowered, or adjusted to penetrate the earth at a greater or less depth, and also raised entirely out of the earth when necessary, and the plowing by its peculiar construction rendered extremely simple and efficient.]

### 46,379.—Self-setting Animal Traps.—H. B. Myers, Schoolcraft, Mich.:

I claim the combination of the pendulous detent, E, provided with the groove or channel, h i h, and resetting itself by its own gravity, with the fixed bait hook, d, the weighted platform, and the box of the trap, substantially as above described.

[This invention consists in the novel manner of resetting the trap after an animal is caught in it.]

### 46,380.—Locomotive Head Light.—Thomas J. Newland, Utica, N. Y..

I claim the combination and arrangement of the barrels or cylinders, A B C and D, used and operating substantially in the manner and for the purpose mentioned.

Second, The beveled ends of the inner cylinder, D, separately and in combination, used and operating substantially in the manner and for the purposes mentioned.

### 46,381.—Expansible Reed for Warp-dressing and Weaving.—Ambrose J. Nichols, Providence, R. I.:

I claim the combination of the crossbars, c c, and screws, e, with the elastic ribs, a a, and grooved frame, A, all constructed and arranged as and for the purpose herein specified.

### 46,382.—Picture Frame.—Marcus Ormsbee, New-York City:

I claim the flexible plate forming the back of a picture frame, in combination with the tongues or lips cut out of and made from the back or plate to form attachments or supports to the picture, substantially as herein described.

### 46,383.—Cultivator.—Ira A. Palmer, Monmouth, Ill.:

I claim, first, The draught equalizer composed of the rods, D D, provided with arms, d d', at their upper and lower ends, and placed at right angles to each other, with the lower arms projecting at right angles from the machine, with the upper arms, d, connected by a rod, E, and the whiffletrees attached to the lower arms, d', substantially as and for the purpose set forth.

Second, Connecting the plow-beams, E, to the bars, c, of the main

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frame, A, through the medium of the bars, k, which work on adjustable pins or rods, l, in plates, m, attached to the bars, c, and the pins, j, which pass through plates, i, attached to the plow-beams and through the bars, k, all being arranged substantially as and for the purpose specified.

Third, The particular manner of constructing the main frame, A, to wit, of the side bars, a a, arranged in V form, connected at their upper ends by cross-bars, b b, and mounted on wheels, B, substantially as herein set forth.

[This invention relates to a new and improved cultivator designed more especially for cultivating corn, and it consists in a novel manner of attaching the team to the implement whereby the corn will not be liable to be bent down and broken by the whiffletrees, and the draught of the two animals equalized. The invention also consists in a novel way of attaching the plow-beams to the main frame of the machine, whereby the two beams may be set or adjusted at a greater or less distance apart as may be desired, and allowing both a lateral and vertical movement.]

### 46,384.—Manufacture of Sheet Iron.—Daniel L. Pratt, Bridgeport, Ohio:

First, I claim the herein described series of processes, substantially as described.

Second, I claim subjecting the sheet iron, after it has been cleansed of its scale and of the operating chemicals and water, to a bath or coating of oil, which is rolled in cold or at a temperature that will not dissipate the oil.

Third, I claim subjecting the sheet, after it has been removed from the bath of alkaline solution, to the action of revolving brushes, upon each of which a jet or stream of water is thrown.

Fourth, I claim the combination of an organic and mineral acid in the acidulous bath, substantially as described.

### 46,385.—Retaining and Releasing Hooks.—Thomas E. Purchase, Reading, Pa.:

I claim the within described retaining hook, consisting of a body, A, pawl E, and spring lever, B, all constructed and arranged substantially as set forth.

### 46,386.—Spinning Machine.—Thomas Pye, New Hartford, N. Y.:

I claim the improvements in the operations of the spinning jack in woolen manufactories, as I have described it, consisting of the levers, a c and d, the slide bolts, n and x, and the lifter, A O., figure 1, the weight and lever, D E, figure 2, and the sheave, t, figure 3, with their connections, adjustment and adaptation, as described, and for the purposes described.

The whole being arranged, combined, and operating substantially in the manner herein set forth.

### 46,387.—Mode of Curing Tobacco.—Peter Rauch, South Lebanon, Pa.:

I claim the mode and manner of regulating and ventilating the curing of tobacco by the single or double ventilating boxes and packing, as herein described, and for the purposes set forth.

### 46,388.—Railroad Rail Joint.—George M. Ramsay, New-York City:

I claim the combination of the miter or lap joint together with the clamp, substantially as described.

Also, making the slot, A a, longer than the union, c, substantially as described.

Also, making the ends, b b, to extend beyond the end of c, substantially as described, for the purposes described.

### 46,389.—Self-locking Nut.—J. H. Raymond and W. J. Brassington, Brooklyn, N. Y.:

First, We claim the dog, C, so applied within the nut and held in contact with the screw thread of the bolt by a spring that by any tendency to turn the nut in one direction the friction of the said dog on the surface of the said thread is caused to draw its point toward the center of the bolt, and so make it bite the thread at any part of its surface, substantially as herein described.

Second, The hole, e, in combination with the dog, C, and the slot, a, in the nuts, substantially as and for the purpose herein specified.

### 46,390.—Lithographic Printing Press.—Edwin Reynolds, Mansfield, Conn.

I claim in combination with an oscillating carriage, through which movement is imparted to the stone to ink its surface and to carry it under the tympan and rotation is imparted to the tympan. I claim the construction of the oscillating gears by which the tympan is kept in contact with the stone as they move in juxtaposition, when this construction is combined with mechanism which arrests the motion of the tympan or locks it in position during the back movement of the stone.

Also, the arrangement of the mechanism for connecting the tympan gears with the tympan frame for the forward movement of the stone and disconnecting them for the back movement of the stone, substantially as set forth.

Also, so arranging this clutching mechanism that the tympan frame can be disconnected from the tympan gears for the entire back and forth movement of the stone.

Also, so constructing the tympan frame that while one end of the tympan is stationary with respect to the tympan cylinder, the other end is attached to a yielding bar, for the purposes substantially as described.

Also, constructing the rotary tympan frame with an open space between its two parts, l and k, to permit access to or removal of the scraper when the tympan is in position to bring such space beneath the scraper, substantially as shown and described.

Also, when a series of three or more ink rollers are employed such disposition and application of them with reference to the path of movement of the stone and the position of the main ink cylinder that while the rollers are brought into position to rotate in contact with the flat surface of the stone as it traverses beneath them they shall also be carried at proper times, by a series of concentric bearings into positions around and in contact with the curved surface of the main ink cylinder, substantially as described.

### 46,391.—Machine for Mortising Plane Stocks.—John Richards, Columbus, Ohio.

First, I claim the combination of an adjustable inclined stock holder, F, with a boring tool which receives a rotary motion and at the same time a vibrating motion, substantially as described.

Second, The construction of the stock support, F, in combination with the bed, G, and camp, S', substantially in the manner and for the purpose set forth.

Third, A gage, p, applied to the face of the stock holder of a machine adapted for cutting the throats in plane stocks, substantially as and for the purpose set forth.

Fourth, The combination of the stock, F, adjustable clamp, s, and rotary auger, substantially as and for the purpose set forth.

### 46,392.—Machine for Mortising Plane Stocks.—John Richards, Columbus, Ohio.

First, I claim producing the cheeks on each side of the throat of a plane stock by means of a rotary vibrating auger operating in conjunction with a double inclined bed, F, which is adapted for holding the stocks in a proper position to receive the auger, substantially as described.

Second, The stock holding bed, F, constructed with double inclined surfaces, h h', and provided with gages and clamps for holding the work in place during the operation of forming the cheeks, substantially as described.

### 46,393.—Horse Hay Forks.—John L. Ripley, Fremont, Ohio:

I claim the bolt, E, attached to the spring, H, and having the rod, F, connected to it by a pivot, d, in combination with the inclined plate, I, and the curved part, b, of the bar, D, all arranged to operate substantially as and for the purpose herein set forth.

This invention relates to a new and useful improvement on a horse hay fork, for which Letters Patent were granted this inventor bearing date Sept. 6th, 1864. The object of the invention is to obtain a better lock or fastening for the fork, one which will be less liable to get out of repair or become deranged by use, and capable of being operated with greater facility.]

### 46,394.—Harvesting Machines.—E. P. Russell, Manlius, N. Y.:

First, I claim hinging the cutting apparatus to the draft frame, by means of an anguiar-draw bar, which answers also as a hinge, i, and brace for the cutting apparatus in combination with the curved sliding hanger, C, the said parts being applied to the draft frame, substantially as shown, for the purpose of rendering a single hinge joint in the cutting apparatus or its connections capable of serving the purpose of what is known as the "double hinges" or "double rule joint," as set forth.

Second, The curved slotted bearing guide, B, constructed in one piece and applied to the main frame as described in combination with the curved stiff hanger, C, arranged and operated as set forth.

Third, The construction of the curved stop tooth, b, formed on the hanger, C, in combination with the curved lip, g', constructed as shown on the shoe, F, substantially as and for the purpose described.

Fourth, The transverse rigid brace and guide, D, in conjunction with the curved hanger, C, and curved guide, B, substantially as and for the purpose set forth.

Fifth, The manner shown of applying the roller, a, within the eye of the curved guide, B, and upon the curved hanger, C, for the purpose set forth.

### 46,395.—Brazing Brass Screws to Iron Pipes.—Wm. B. Scaife, Pittsburg, Pa.:

I claim as an article of manufacture a tubular coupling in two sections, constructed so as to be screwed together, each section being provided with holes or apertures through which melted solder or other material may be poured in order to cement or permanently attach said sections to the pipes respectively, which are to be coupled together.

### 46,396.—Photographic Camera Stand.—James Scouler, San Francisco, Cal.:

First, I claim the skeleton platforms, C C', connected to each other by a hinge joint, b, and to the frame, A, by a hinge, a, to operate in combination with the spring pawls, D D', and serrated bars, E E', in the manner and for the purpose substantially as described.

Second, The hand lever, G, and bottom, J, in combination with the platform, C, and pawl, D, constructed and operating substantially as and for the purpose set forth.

The adjustable serrated bar, D', in combination with the platforms C C', and set screw, d, constructed and operating as and for the purpose set forth.

### 46,397.—Comb for combing Wool, Flax, Cotton, etc.—John B. Siccardi and James Hyde, New York City:

We claim the construction of a comb with metal points or teeth, when said teeth are passed through holes made in the plate, I, and secured at its back by means of a suitable cement, the whole being constructed in the manner substantially as described and specified.

### 46,398.—Corn-planter.—J. N. Smith, Galva, Ill.:

I claim attaching the frame carrying the furrowing device and seed boxes to the forward end of the pivoted frame, A, so that by the forward or rear movement of the driver's seat by means of the lever g, crank shaft, p, and carriage m, the weight of the driver may be made to partially counterbalance the weight of the forward frame and modify the depth of the furrow.

[This invention relates to an improvement in that class of corn-planters which open their own furrows by means of runners, and in which the depth of the furrows is regulated by the position of the driver's seat, which can be adjusted backward or forward.]

### 46,399.—Brick Machine.—Josiah T. Smith, Springfield, Ill.:

First, I claim the combined arrangement of the pulverizers, molds, or plungers, and the cam motion, for the purposes as substantially set forth.

Second, Discharging the brick from the molds downward, being the mode in which they are pressed, thus avoiding derangement in the particles of clay, leaving the brick as smooth and perfect as when pressed.

Third, The movement of the bottom across the face of the plungers, removing the brick, and perfectly cleansing the face of the plungers of any particles of clay which might adhere to them.

### 46,400.—Machine for Stretching Paper Collars.—Chas. Spofford and W. S. Bell, jr., Boston, Mass.:

We claim the sliding carriage, E, with its curved recess, d, in combination with the stationary block, I, and cylinder, L, operating substantially as set forth for the purpose specified.

### 46,401.—Milling Machine.—Edwin C. Stiles, Portland, Me.:

First, I claim producing an elastic bearing for the counter die, C, or its equivalent, by means of the spring, J, and its set screw, d, substantially as described.

Second, In machines for milling screw heads and other articles causing the curved face of the vibrating die, B, to operate in connection with the concave face of the adjustable counter die, C, substantially as described.

[In all milling tools and machines heretofore known, the work or article to be operated upon is rotated by a lathe or other means, and the milling tool revolves in contact with the work. By this invention the article to be milled is received and operated upon by the tool without the application of power to the article, thereby doing better work and in a different and more simple mode, and at less cost.]

### 46,402.—Burglar-alarm.—Bernhard L. Stone, San Francisco, Cal.:

I claim the arrangement of the hammers, B and C, the invention of lever, G, and spring, H, as arranged, together with the arrangement of the triangle, I, as attached to lever wire, G, and extending from one end of the triangle, I, and a wire or cord, Q, which is fastened to the other end of the triangle, I, and extends to cap, K, which also I claim as my invention, together with the arrangement and operation of the spring door bolt, L, which by throwing off the cap, K, sets the alarm in operation. The alarm continues until the machine runs down.

### 46,403.—Water Elevator.—Asahel Tarbox, Willimantic, Conn.:

I claim, first, The combination with a rotating shaft of a loose crank which can be alternately connected with and disconnected from the shaft on which it is hung by means of its enlarged eye and a dog on the side of the crank, substantially as above described.

Second, In combination with a crank constructed and operating as above described, the brake apparatus, consisting of the lever, D, its detent, D2, its brake, D1, and the ratchet wheel, a, and friction ring, b, substantially as above set forth.

### 46,404.—Cigar Machine.—J. Thompson, New York City:

I claim the adjustable mold, C, in combination with the longitudinally sliding revolving fork, D, constructed and operating substantially as and for the purpose set forth.

### 46,405.—Mode of Manufacturing Paper Twine.—Isaac P. Tice, New York City:

I claim the manufacture of paper twine by twisting the paper in a dry state, afterward moistening it, and subjecting it to a stretching operation while in a moist state, substantially as herein described.

### 46,406.—Mop.—George W. Tolhurst, Circleville, Ohio:

I claim the combination of the handles, A A', cross pieces, B B', and brace, D, substantially as specified.

### 46,407.—Machine for Polishing Marble.—Asa M. Tomb, Lyons, N. Y.:

I claim the combination and arrangement of the sliding block, K, way, G, shaft, L, double pulleys, n n, and the band, F, wound around said pulleys on opposite sides in such a manner that while said sliding block is allowed a free reciprocating motion without unusual friction the shaft is revolved by the band substantially as herein set forth.

I also claim the hinged way, G, so arranged as to swing aside to enable the stone to be adjusted on the carriage and to serve as the guide to the sliding block, K, substantially as herein described.

I also claim the polishing device consisting of the head, M, radical arms, s s, and jaws, t t, so arranged that each set of jaws can be adjusted at varying distances from the head substantially as and for the purpose herein specified.

Also claim connecting the head, M, with the shaft, L, by means of the depressions, q q q, and arms, o o, in such a manner as to produce a free joint so that the polishing device will adapt itself to the surface of the stone substantially as herein described.

I also claim shifting the engagement of the pinion, f', with the pinion, g' h', by means of the bar, N, provided with cam, P, the dogs, o o, and the shaft, k', provided with the pins, r, crank and weight, n' o', and cams, m' m', the whole arranged, combined and operating substantially as herein set forth.

I also claim the holes, s' s', in the carriage, B, and the shifting pins, u' u', when used in combination with the rack, r', pinion, q', and shaft, k', for gaging the stroke of the carriage to the length of the stone substantially as herein set forth.

### 46,408.—Shoe String.—Wm. H. Towers, New York City:

I claim the improved shoe string or lacing made from raw or untanned hide, with the ends made impervious to moisture and pointed ready for use, substantially in the manner and for the purposes above described.

### 46,409.—Method af Finding Waist and Chest Measurement of Ladies' Dresses.—M. M. Turner, North Fairfield, Ohio:

I claim the method of finding the waist and chest measurement substantially as described.

### 46,410.—Knapsack Slings.—J. T. Warren, Stafford, N. Y.:

I claim the arrangement and construction of the metallic slings E E, with their yielding straps, D D, and back strap, G, as herein described and for the purposes set forth.

### 46,411.—Cartridge Box.—Martin V. P. White, Troy, N. Y.:

I claim the employment of the apron, E, with the vertical end piece, I, thereto attached in combination with the inner box, B, and the coil spring, D, in the manner and for the purposes substantially as herein described and set forth.

I also claim the employment of the inner case, B, in combination with the outside case, A, substantially as and for the purposes herein described and set forth.

I also claim the removing of cartridge from the one end of the cartridge box in the manner and by the means substantially as herein described and set forth.

### 46,412.—Wheeled Plow.—Richardson Wilson, Fowler, N. Y.:

I claim the arrangement of the vertical adjustable supports D J, with regard to the beam, E, and the axles of the supporting wheels, A H, as and for the purpose herein described and represented.

### 46,413.—Graduated Dumb Bells.—Geo. B. Winship, Boston, Mass.:

I claim, first, constructing graduated dumb bells of flat discs or sections substantially as and for the purpose described.

Second, Fixing the two inmost discs, I I, upon the handle, A, by means of the holes, e, and the imbedded stationary pins, c c, substantially as described.

Third, The method of confirming the removable discs or sections, by means of the spring pins, D, and holes, b, substantially as and for the purpose described.

Fourth, Constructing the handle, A, of a dumb bell sub hollow metallic cylinder, substantially as set forth and for the purposes described.

### 46,414.—Stove pipe Ventilator and Draught Damper.—Gurdon G. Wolfe, Troy, N. Y.:

I claim the employment and combination of the vertical register, C, with the damper, E, in the manner substantially as herein described and set forth so that the same may together be operated independent of and separate from or with the register, C3, in the manner and for the purposes herein described and set forth.

### 46,415.—Paper Files.—Wm. L. Words, Washington, D. C.:

I claim the file box, figures 1 and 2, in its combination with pigeon holes or shelves in vaults, safes and portable cases substantially as set forth and described above.

### 46,416.—Steam Trap.—L. W. Woodward, North Adams, Mass.:

I claim the steam trap constructed and operating substantially as above described.

[This invention consists in a novel construction of steam traps in which the opening and closing thereof is caused by the alternate expansion and contraction of the pipe which forms the connection between the steam apparatus to be cleared of the water of condensation and the trap.]

### 46,417.—Breech-loading Ordnance.—Theodore Yates, U. S. A., Milwaukee, Wis.:

I claim the combination of the lever, C C, cap, D, and sliding breech block, D, constructed and operating substantially as and for the purposes herein described.

### 46,418.—Plow.—Wm. B. Young, Chicago, Ill.:

I claim a plow standard made of sheet iron or steel with the upper part bent or curved constructed and operating substantially as above described.

### 46,419.—Sugar Boiling.—Edward Beans, London, Eng., and Conrad Wm. Finzel, Bristol, Eng., assignors to themselves and Theo. A. Havemyer, New York City:

We claim the employment or use in boiling sugar in vacuum pans of hot water at or as near as may be to the boiling point or steam of a pressure of not more than one pound to the square inch or as near as may be to that pressure substantially as herein set forth to prevent carbonization and coloring of the saccharine liquids and of the sugar

[This invention consists in the use of hot water, or as near as may be, to the boiling point, or of steam at a very low pressure, for the purpose of boiling sugar in vacuum pans.]

### 46,420.—Well Boring Apparatus.—Charles E. Foster, Philadelphia, Pa., assignor to the Rock Drill & Mining Company, Penn.:

I claim, first, The combination substantially as described, of one or more direct acting steam or compressed-air cylinders with a plate carrying the levers, h, or their equivalents, and with a boring bar for the purpose specified.

Secondly, The combination of the cylinder, C, trunk, D, levers, h, or their equivalents, and bar, F.

### 46,421.—Machine for Straightening Elliptic Springs.—James W. Gray and Charles H. Curtis, (assignors to themselves and the Spring Perch Company,) Bridgeport, Conn.:

We claim, first, the combination of the sliding plate, a, and the joint, d, with the table, A3, and its rim, f, constructed and operating substantially as and for the purpose above described.

Second, The combination of the levers which operate the jaw, d, and sliding plate, a, with the cams, C C, and the spring, E, or its equivalent all constructed substantially as above described.

[The object of this invention is to produce a machine which will straighten the leaves or plates of carriage-springs, after they have been wrought or rolled out, by a single operation.]

### 46,422.—Improved Stove.—R. Little, (assignor to himself and Samuel Little.) Canton, Ohio:

I claim the application to stoves of the removable lining plates, B, substantially as and for the purposes described.

I also claim the removable side linings, B, in combination with the closed sides, C, of the stove substantially as herein described.

I also claim the combination of the removable linings, B, of the stove with reflecting surfaces, S, for the purpose of concentrating the heat on the stove substantially as herein described.

### 46,423.—Furnace Doors for Boilers.—James Penketh, (assignor to himself and John E. Eastman,) Chicago, Ill.:

I claim constructing the furnace doors of steam boilers by turning the boiler plate inwards and the furnace plate outward and lapping and riveting said plates together substantially in the manner and for the purpose herein specified and shown.

### 47,424.—Sewing Machine for Making Band Ruffling.—Thomas Robjohn, (assignor to E. C. Wooster,) New York City:

I claim, first, The combination with each other and with a sewing machine, of a guide for turning in the edges of and folding one strip of cloth to form a double band, a guide for guiding another strip of cloth into such band to form a ruffle, and a plaiting or ruffling knife, the whole operating substantially as herein specified.

Second, In combination with the ruffling knife acting above the strip which is to form the ruffle I claim the extension of a portion of the bottom, i, of the guide, F, or its equivalent below the said knife in such position as to be interposed between the ruffle strip and the lower part of the band substantially as and for the purpose herein specified.

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**46,425.—Sawing Machine.**—C. B. Rogers, (assignor to C. B. Rogers & Co.,) Norwich, Conn.:

I claim, first, So arranging the feed rollers, C C, in movable frames, a a, and applying a screw rod to operate upon these frames that the rollers can both be adjusted together in a plane parallel to that of the saw the parts oeing constructed, arran ged and operated substantially as described.

Second, The combination of pivoted arms, d d, sliding cross head, b', and adjusting screw, o, with feed rollers which are supported in adjustable frames, a a, substantially as described.

Third, The spring, f, and the frames, a' a', of the pressure rollers, D D, in combination with the adjusting screw, e', and slide, e, substantially as and for the purposes described.

Fourth, Providing for the use of circular saws of different diameters by mounting the saw arbor upon a longitudinally adjustable frame, H, constructed, arranged and operating substantially as described.

Fifth, The adjustable saw arbor, G, in combination with feed rollers, C D, all arranged substantially as and for the purposes described.

Sixth, Adjustable guide, F, or its equivalent in combination with the adjustable saw arbor, G, substantially as described.

**46,426.—Neck-tie Supporters.**—George K. Snow, (assignor to himself and "March, Bros., Pierce & Co."), Watertown, Mass.:

I claim the said bow or scarf supporter as composed of the bow attachments, a a, the button socket or saddle, b, and the elastic arms, c c, the whole being made of wire or its equivalent substantially as specified.

**46,427.—Boot Crimping Machine.**—John S. Landes, (assignor to himself and Henry G. Halbach,) Lancaster, Pa.:

I claim the construction and arrangement of the pieces, B C, connected by a hinge, a b c, to the central projection, a, on the base piece, A, with the two handled screws, F G, in A, acting on said pieces, B C, respectively.

I also claim the pieces, B C, and their hinged attachment to A, in combination with their sheet iron plates, D E, and their attachments respectively in manner shown, for operating upon the leather held by the clamps, L' L" L"', by means of the handled screws, F G, all arranged and operating substantially in the manner set forth for the purpose specified.

**46,428 —Sawing Machines.**—Charles P. Wiggins, (assignor to Case, Marsh & Co.,) Indianapolis, Ind.:

I claim the adjustable slide, E, when connected to guide bar, D, and constructed to operate substantially as described.

**46,428.—Water Wheel.**—Joab H. Wooster, Strykersville, N. Y., assignor to himself and Robert Dunbar, Buffalo, N. Y.:

I claim, first, A water wheel bucket having partitions, C, for the purposes and substantially as described.

Second, The combination and arragement of the shaft, J, including the step, J', with the solid shaft, F, and a hollow shaft, F', for the purpose of locating and supporting the step, J', above the water substantially as herein described.

**46,430.—Governor for Water Wheel Gates.**—Joab K. Wooster, Strykersville, N. Y., assignor to himself and Robert Dunbar, Buffalo, N. Y.:

I claim a belt of varying width running over three pulleys located in close proximity to each other on one shaft, the middle pulley being loose on the shaft, and the two outside being made fast on the shaft; and which shaft is by means of rack and and pinion, or other suitable device, connected with a water wheel gate, and a "governor" of ordinary construction, so that the governor will control the movements of the gate, to admit a greater or less quantity of water upon the wheel substantially as described.

**46,431.—Process for Improving the Color of Molasses.**—John Von Bohm, Melbourne, Australia:

I claim the employment of tannin, substantially as herein described, in the purification of molasses.

**46,432.—Apparatus for Carbureting Air.**—Wm. Henry Buckland, London, Eng. Patented in England, March 5, 1863:

I claim the gas apparatus herein represented and described consisting of the reservoir, a, false bottom, b, perforated partition, e e, covered with fibrous material, inlet aperture, f, and exit g, all constructed, arranged and operating as specified.

**46,443.—Looms for Weaving Double Faced pile Fabrics.**—Pierre Joyot, Junior, Paris, France:

I claim in the manufacture of a double faced fabric or tissue presenting either a cut or non-cut pile velvet on part or on the entire of both surfaces of the fabric or tissue—the application instead of the ordinary pile wires, of double pronged forks, one prong or more of which serves for forming the upper and the other prong for forming the lower pile, the said prongs or wires being either provided with a cutting edge or not and the forks being moved automatically by the loom substantially as set forth.

**46,434.—Machine for Heading Bolts.**—F. Watkins, London Works, Birmingham, Eng.:

I claim, first, The employment or use of a vertical slide or slides carrying at their lower ends changable dies which are provided with cavities in their lower surfaces corresponding with the size and form of the heads required.

Second, The use of a movable carriage or carriages, containing changeable and adjustable heading tools, which are provided with holes, or sockets corresponding with the body or shank of the bolt, arranged in combination with the hand levers or other equivalent device, substantially in the manner herein specified so that the operator working the machine may conveniently place the blank or remove the bolt, spike or rivet, when completed.

Third, The arrangement of levers substantially such as herein shown and described for the purpose of partly removing the articles from the heading tools after the same have been operated upon by the header.

Fourth, The application of india-rubber or other suitable springs, substantially as described for the purpose of furnishing a yielding bearing, necessary for the safe working of the machine.

Fifth, Making the heading tools and dies of cast iron with chilled surfaces.

## RE-ISSUES.

**1,868.—Machine for Hulling Clover.**—Emma A. Blackwell, Ovid, N. Y., administratrix of the Estate of Ishi V. Blackwell, deceased. Patented March 30, 1858.

I claim, first, The construction of the grinding surfaces of clover machines with teeth made and case-hardened substantially as described.

Second, The application of the gravitating curtain, H, at the point of eduction of the blast for the purpose of modifying and diffusing the same and preventing the waste of seed substantially in the manner shown and described.

Third, The combination and arrangement of the overshot grating cylinder, C, constructed as described, with the concave, E, feed roller, D, and blast generator, G, the whole operating conjointly in the manner and for the purpose herein described.

**1,869.—Hay Elevator.**—F. F. Fowler, Crane Township, Ohio. Patented April 17, 1860. Re-issued Sept. 9, 1862:

I claim, first, In the construction of elevators for hay, the combination of the permanent pyramidal supporting frame and the revolving cross-bar and its braces, with a central supporting piece, for allowing the cross bar and its braces, to turn upon the supporting frame, substantially in the manner and for the purposes described.

Second, In the construction of elevators for hay, I claim in combination with the cross bar revolving upon an under supporting frame, the so arranging of the sheaves and hoisting tackle, that the weight to be raised shall be upon one end of the cross bar, whilst the power to raise that weight is applied to the opposite end of the cross bar, for the purpose of enabling me to use a small and compact structure that may be easily transported, or moved, occupying but little space, and sufficiently rigid within itself without the use of additional guys, braces, or other fastenings as herein described.

Third, In the construction of elevators for hay, I also claim two pyramidal frames, one placed upon the other, the under frame being upright, and the upper one inverted, and the head blocks, or pieces of both so united as that the upper frame may freely turn upon, whilst it is supported by the lower frame, substantially as described.

**1,870.—Canceling Stamp.**—John W. Foster, Washington, D. C. Patented Jan. 3, 1865:

I claim a canceling stamp provided with an annular cutter, C, and an internal gage, B, either one or both adjustable in relation to each other, substantially as and for the purposes set forth.

Second, I claim the combination of the double set screws, E F, with the cutter, C, and gage B, for the purpose specified.

Third, I claim the adjustable blocks, H H, operated by the screw, J, and employed to lock the type of the stamp, substantially as set forth.

**1,871.—Hay Elevator.**—F. F. Fowler, Crane Township, Ohio. Patented April 17, 1860. Re-issued Sept. 9, 1862:

I claim, first, So constructing a machine for elevating hay, or other like products that the same power employed in elevating said products will also revolve the top of the machine, while the load is being elevated, or when high enough to pass over the top of the stack, and so that it may be raised from either, or any side of the machine and deposited on the stack, at any other side, and wherever desired, substantially as described.

Second, An elevation, or crane, when conducted as herein described, in combination with a device for grasping hay, or other products, and depositing it upon a stack, substantially as described.

**1,872.—Hoop Skirt.**—Sarah A. Moody, New York City. Patented May 10, 1864:

I claim a hoop skirt having any number of its lower hoops divided and jointed on each side with flexible joints, substantially as and for the purposes herein described.

**1,873.—Chair Seat.**—Henry J. Seymour, Troy, N. Y., assignee of Robert Wood, West Troy, N. Y. Patented March 29, 1864:

I claim chair seats and chair backs made substantially as described, as a new article of manufacture.

**1,874.—Tempering Wire.**—Henry Waterman, Brooklyn, N. Y. Patented Aug. 24, 1858.

I claim the process, substantially such as herein described, of hardening steel wire or other thin steel of any desired length, which process consists in drawing the wire continuously, whilst under tension through the heating medium and thence through the hardening liquid.

## DESIGNS.

**2,031.—Burial Case.**—F. H. Stickney, East Cambridge, Mass.

# PATENTS

GRANTED

FOR SEVENTEEN YEARS.

**MUNN & COMPANY,**

In connection with the publication of the SCIENTIFIC AMERICAN, have act ed as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

### THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

### PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

### THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

### CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

### REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

### FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

### HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

| | |
|---|---|
| On filing each Caveat | $10 |
| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Re-issue | $30 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design (three and a half years) | $10 |
| On filing application for Design (seven years) | $15 |
| On filing application for Design (fourteen years) | $30 |

### SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

### INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

### COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.


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### EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

### ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

### UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row. New York

## Notes and Queries

**E. J. B., of Ohio.**—The pictures that made their appearance on your friend's ambrotype plates were simply latent images which had been previously taken on the same plates. He had not cleaned his plates thoroughly. The occurrence is quite common, and has been fully discussed in our columns.

**R. B., Ind.**—Take white lead and put red lead enough to make a stiff dough and you will have a good joint for steam or hot water. The joint must be faced true, however.

**J. & S., of Conn.**—You can stain wood black by soaking it in black ink. But if you wish a finished surface you must cover the wood with black varnish and then polish.

**B. W., of Mo.**—There are few if any positions so free from creeks, ravines and hills that a battery plated proof against heavy ordnance could be transported to the front of our lines.

**S. D. R., of Tenn.**—A gallon, wine measure, contains 231 cubic inches, and a cubic foot of water weighs 62½ pounds; therefore a gallon of water weighs 8·34 pounds. A horse power is produced by the fall of 33,000 pounds one foot per minute. Consequently with a fall of 30 feet, to obtain 10-horse power you must have a flow of 11,000 pounds of water per minute, which is equal to 1,319 gallons.

**H. H. S., of N. Y.**—We are not certain that we understand your magnet apparatus; if we do we should suppose that the attraction of the surrounding wires for the permanent magnet would be far stronger than for the second bar, and that the tendency would therefore be to hold the bars still.

**W. D., of N. Y.**—There are two processes for purifying tin from iron and other metals, but neither is sufficiently cheap and simple to be practiced on a small scale, and you may be sure that tin of any respectable brand has been subjected to one or the other.

**E. L. N., of N. J.**—Lead placed in distilled water is converted into white lead, which is a carbonate. The change is doubtless effected by the joint action of the water and the carbonic acid which it contains. Priestly lived in Northumberland, Pa., where he died February 9, 1804. He left a son, who continued his autobiography, which was published with his works by John Rutt, in 1817.

**G. P. F., of Minn.**—Bourne's Catechism is a good book for you. Also King's Notes on the Steam Engine. The latter is the best. You can't learn to be a machinist from a book.

### Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 8, to Wednesday, February 15, 1865:—

A. K., of N. Y., $25; C. Van H., of N. Y., $12; A. T., of N. Y., $25; B. H., of N. Y., $30; J. S., of N. Y., $25; F. K., of N. Y., $25; L. D., of N. Y., $25; J. B., of N. Y., $25; J. M. C., of N. Y., $25; G. W. B., of N. Y., $35; D. A. D., of N. Y., $25; E. H., of N. Y., $25; G. H. G., of N. Y. $40; G. M. W., of N. Y., $30; W. A. O., of N. Y., $25; S. S. S., of N. Y., $25; E. R. W., of N. Y., $25; R. G., of N. Y., $25; W. H. P., of N. Y., $30; C. B., of N. J., $20; G. T., of N. Y., $15; G. F., of N. Y., $35; J. J. S., of Conn., $20; T. J. L., of R. I., $20; E. C., of N. Y., $45; G. G., of Pa., $45; T. & T., of Mass., $20; J. G. S., of Mass., $20; W. D. K., of N. Y., $22; G. W. H., of N. Y., $40; J. B., of N. Y., $20; J. B. C., of N. Y., $15; P. C., of N. Y., $40; J. W. B., of N. Y., $40; F. M. G., of N. Y., $20; J. H. W., of N. Y., $20; H. S. McK., of Pa., $20; I. N. S., of N. Y., $15; S. & H., of Mass., $20; T. W. H., of Wis., $20; S. C. B., of N. Y., $20; A. H. S., of N. Y., $20; L. S., of N. Y., $35; G. H. & G., of Iowa, $20; L. D. H., of Ill., $20; W. K. L., of Mass., $20; O. W. K., of Wis., $20; R. B. P., of Pa., $20; J. W. C., of N. Y., $22; B. M. S., of N. Y., $16; J. S. G., of Pa., $22; M. & H., of N. J., $20; J. A. B., of Ind., $15; H. H., of N. Y., $45; J. A. M., of N. Y., $15; A. S. L., of N. Y., $45; A. W., of N. Y., $15; W. J. & R. C., of N. Y., $22; H. A. R., of N. Y., $20; G. W. S., of Pa., $20; L. E., of N. Y., $15; L. M., of Wis., $20, E. F., of N. Y., $22; C. B. G., of Iowa, $20; E. P. S., of Mass., $20; J. L. H., of Conn., $20; T. L. S., of Mass., $20; J. P. B., of Conn., $15; E. J. W., of N. Y., $40; J. B., of N. Y., $15; E. H., of N. Y, $20; B. & S., of Mass., $21; J. W. N., of Conn., $81; E. B. T., of N. Y., $20; W. N. B., of Ill., $45; W. A. D., of N. Y., $20; E. P. B., of Pa., $20; I. & W., of Ill., $20; C. E. R., of N. Y., $20; G. & H., of Conn., $45; C. W. C., of N. Y., $10; M. W., of N. Y., $15; A. T. S., of Cal., $20; T. H. W., of N. H., $25; J. W., of Cal., $25; R. R., of N. Y., $15; G. L. D., of N. Y., $25; W. B. P., of Mo., $15; J. W. A., of N. H., $25; E. McK., of Pa., $16; W. S., of N. Y., $20; G. W. S., of Pa., $17; W. S. R., of Conn., $25; J. H. P., of N. Y., $150; H. H., of Wis, $10; T. S. La F., of N. Y., $16; F. J. C., of Pa., $25; S. H., of Mich., $10; S. S., of Ill., $16; R. V. J., of Ohio, $16; F. G., of Pa., $15; L. V., of Wis., $15; T. S., of Conn., $25; G. F. W., of Mass., $15; R. M., of C. W., $31; J. E. M., of Wis., $30; W. K., of Wis., $25; D. E. R., of Mich., $15; L. B. D., of R. I., $16; W. F., of Mich., $15; S. & S., of N. J., $16; H. H., of Mich., $10; G. E. S., of Mass., $25; C. D. W., of Conn., $25; D. & M., of Ill., $10; L. E. H., Jr., of Pa., $16; J. M. L., of Ohio, $20; E. G. N., of Ohio, $16; J. P. D., of Conn., $32; W. O. H., of N. J., $25; G. L. S., of Mass., $15; H. J., of Me., $12; B. M., of Pa., $35; E. W. G., of Mass., $35; H. L. H., of Cal., $30; J. S. F., of Nevada, $103.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 8, to Wednesday, Feb. 15, 1865:—

B. & S., of N. Y.; A. K., of N. Y.; C. Van H., of N. Y.; A. T., of N. Y.; B. O., of N. Y.; J. S., of N. Y.; F. K., of N. Y.; L. D., of N. Y.; J. B., of N. Y.; J. M. C., of N. Y.; G. W. B., of N. Y.; D. A. D., of N. Y.; E. H., of N. Y.; G. H. G., of N. Y.; G. M. W., of N. Y.; W. A. O., of N. Y.; S. S. S., of N. Y.; E. R. W., of N. Y.; R. G., of N. Y.; W. H. P., of N. Y.; H. L. H., of Cal.; F. J. C., of Pa.; G. D. D., of N. Y.; W. S. R., of Conn.; C. P., of Mich.; J. W. A., of N. H.; G. D. G., of N. Y.; R. M., of C. W. (2 cases); G. E. S., of Mass.; C. D. W., of Conn.; W. & H., of N. J.; H. J., of Ind.; I. G. J., of Ill.; J. P. D., of Conn; P. C., of N. Y.; J. W. B., of N. Y.; L. S., of N. Y.; E. F., of N. Y.; E J. W., of N. Y.; B. & S., of Mass.

### TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

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VOLUME IV., AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VII., VIII., IX. and X., are out of print and cannot be supplied.

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INVENTORS AND MACHINISTS ARE INVITED TO correspond with SPENCER HIATT, Cuba, Ind., whose achievements guarantee success, with a view to combine their skill, capital and enterprise to obtain facilities to develop new ideas, secure rights therein, manufacture and obtain patronage. 9 2*

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FLAX-DRESSING MACHINERY FOR SALE.—HAVING relinquished the business, I will sell my machinery, consisting of one large Mallory and Sanford breaker, four sets steel knives, shafting, pulleys, belting, one seed whipper, etc. All in complete order. Also ten tuns scutched tow and twenty tuns rotted woolen tangled flax for sale. JOHN D. BUCKELEW, Jamesburg, N J. 9 2*

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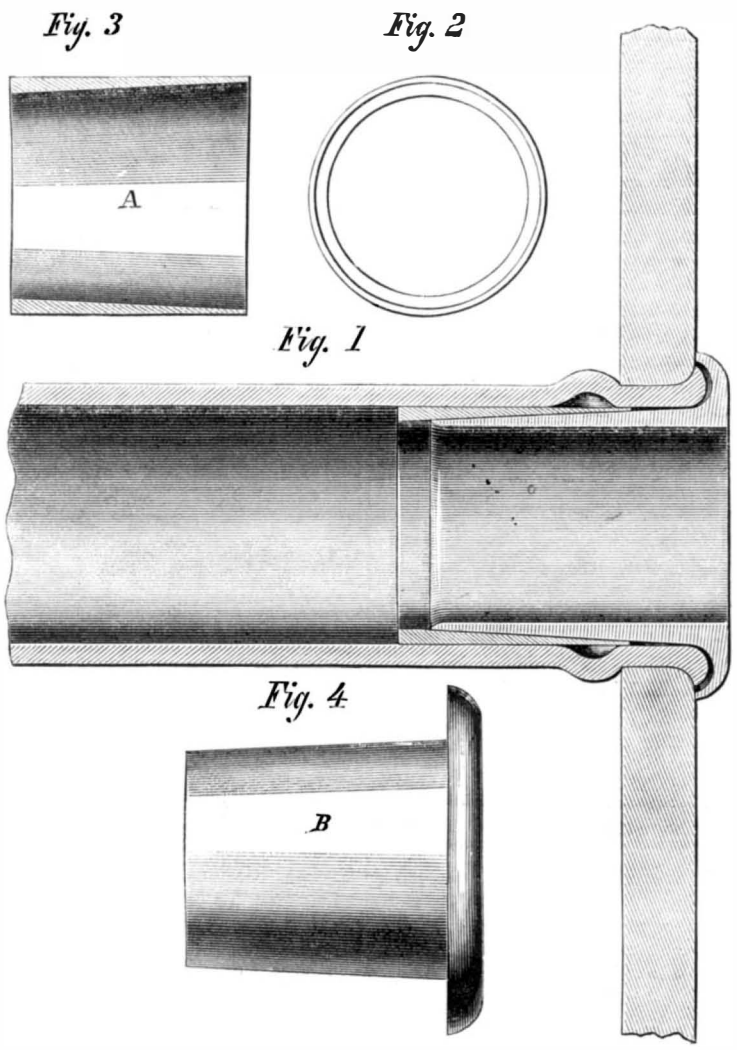
Fig. 1 represents the combined ferrule in place, the object being to prevent leakage and guard against the evils resulting from expansion and contraction of the tube ends when hot and cold alternately.

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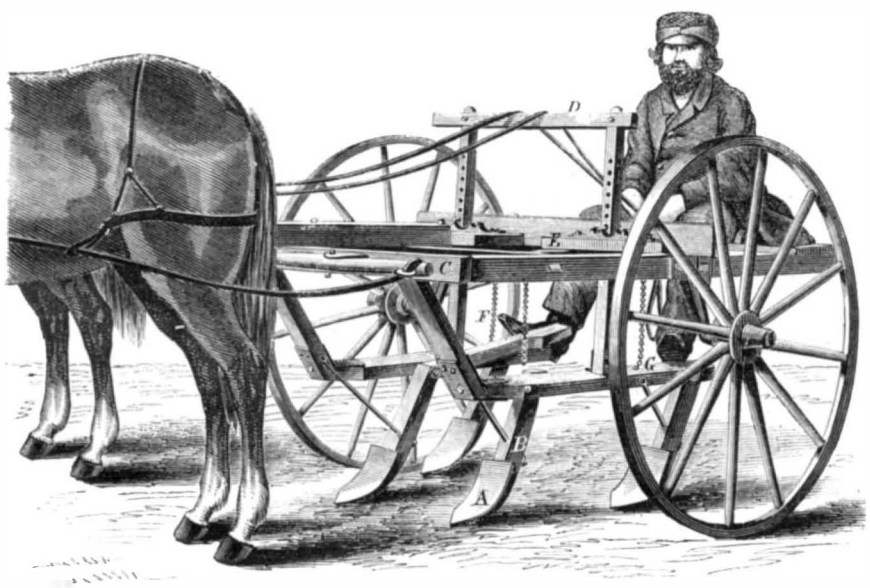


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